

I/568/2018



भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग-II

Power System Planning & Appraisal Division-II

सेवा मे / To,

संलग्न सूची के अनुसार

As per list enclosed

विषय: दक्षिणी क्षेत्र के लिए विद्युत प्रणाली योजना पर स्थायी समिति की 42 वीं बैठक की कार्यसूची।

Subject: Agenda for 42nd meeting of Standing Committee on Power System Planning for Southern Region.

महोदय(Sir)/महोदया(Madam),

दक्षिणी क्षेत्र के लिए विद्युत प्रणाली योजना पर स्थायी समिति की 42 वीं बैठक 27 अप्रैल, 2018 को 10:00 बजे से होटल क्राउन प्लाजा, एरनाकुलम (केरल) में आयोजित की जायेगी। बैठक की कार्यसूची संलग्न है। कृपया बैठक में सम्मिलित होकर अनुग्रहीत करें।

The 42nd meeting of the Standing Committee on Power System Planning of Southern Region will be held at 10:00 hrs on 27th April, 2018 at Hotel Crown Plaza, Ernakulam (Kerala). Agenda for the meeting is enclosed.

Kindly make it convenient to attend the meeting.

भवदीय/Yours faithfully,

(बी.एस.बैरवा/B.S. Bairwa)

निदेशक/ Director

Address List:

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. CEO, POSOCO, B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi-110016	4. The Director (Transmission), Karnataka State Power Trans. Corp.Ltd., Cauvery Bhawan, Bangalore - 560 009. FAX : 080 -22228367
5. The Director (Transmission), Transmission Corp. of Andhra Pradesh Ltd., (APTRANSCO) Vidyut Soudha, Hyderabad – 500 082. FAX : 040-66665137	6. The Director (Grid Transmission and Management), Transmission Corp. of Telangana Ltd., (TSTRANSCO) Vidyut Soudha, Khairatabad Hyderabad – 500 082. FAX : 040-23321751
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9. The Director (Power), Corporate Office, Block – I, Neyveli Lignite Corp. Ltd., Neyveli , Tamil Nadu – 607 801. FAX : 04142-252650	10. The Superintending Engineer –I, First Floor, Electricity Department, Gingy Salai, Puducherry – 605 001. FAX : 0413-2334277/2331556
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1.	Joint Secretary (Trans) Ministry of Power Shram Shaktri Bhawan Rafi Marg, New Delhi-110001	2. COO(CTU-Plg), Power Grid Corp. of India Ltd. “Saudamini”, Plot No.2, Sector-29, Gurgaon 122 001, Haryana. FAX : 95124-2571932
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Agenda for 42nd Meeting of Standing Committee on Power System Planning in Southern Region (SCPSPSR)

Date: 27 April, 2018 Time: 10:00 Hrs

Venue: Hotel Crowne Plaza, Ernakulam, Kerala

1.0 Confirmation of the minutes of 41st meeting of the Standing Committee

The Minutes of 41st meeting of the Standing Committee on Power System Planning of Southern Region (SCPSPSR) held on 19th November, 2016, were issued vide CEA's letter No. 51/4/(41st)/PSPA-II 2016/92-103 dated 16th February 2017.

TANTRANSCO vide their letter dated 16.12.2017 have requested for following ammendments in the Minutes of Meeting::

- a) Para 10.8 (iv) of agenda item 10 (Transmission scheme modification of Manali & Korattur 400/230-110kV substation in Chennai Region): “Korattur – Manali 400 kV S/C line (on the D/C tower) with HTLS conductor” to be replaced by “Korattur –Manali 400 kV S/C line on D/C tower.
- b) Agenda item 12 (Establishment of Konthagai 400/230/110kV substation in Madurai region): Konthagai 400 kV SS has been shown as 400/230/110 kV SS instead of 400/230-110 kV SS. Further approval has been accorded with 2 X 500 MVA, 400/230 kV ICTs only. Hence, in the approval for Konthagai 400/230-110 kV SS, along with 2 X 500 MVA, 400/230 kV ICT, 2 X 200 MVA, 400/110 kV ICT and 2 X 80 MVA_r, 420 kV bus reactor shall be included. The voltage ratio for Konthagai 400 kV substation may be indicated as 400/230 – 110 kV SS instead of 400/230/110 kV SS.
- c) Para 14.2 of Agenda item 14 (Power evacuation Scheme of 500MW Kadaladi Ultra Mega Solar PV Power Project at Narippaiyur of Kadaladi Taluk in Ramnad district under state sector): “LILO of Kamuthi- Thappagundu 400 kV D/C line and Kamuthi- Thappagundu 400 kV D/C line at Virudhnagar S/S had already been approved under evacuation system for Uppur TPS (2x800MW)” to be replace by .

“Kamuthi- Thappagundu 400 kV D/C line and LILO of Kamuthi- Thappagundu 400 kV D/C line at Virudhunagar S/S had already been approved under the establishment of Virudhunagar765/400 kV SS”.

NLC India limited vide their letter dated 14.12.2017& 19.12.2017 have requested for following ammendments in the Minutes of Meeting:

- a) Points No.22.1 (B): wherein it is indicated that the 400 kV connectivity to the proposed 400 kV S/S of TANTRANSCO will be through i) New Neyveli

Thermal power station –Neyveli (TNEB) 400 kV D/C Link.

NLCIL informed that there are no spare bays available for connecting NNTPP with TANTRANSCO, s proposed 400 kV SS through 400 kV D/C lines. Further it was informed that joint inspection can be had for the same by NLCIL & TANTRANSCO.

- b) Points No 13.2 under agenda item 13 (NLCIL-NNTPP (2x500 MW) – Startup Power Requirement): it was recorded that NLC had started availing start up power from STU and LILO of 230 kV TIE Lines I & II (connecting NLC TPS-II and TPS-I) and hence need not be discussed again. Accordingly, Members decided to drop this proposal from discussion.

NLCIL requested to drop the agenda points of drawl of Startup Power to NNTPP since approval had already been obtained in the Commercial Sub Committee meeting of SRPC for availing startup power through Deviation Settlement Mechanism (DSM) as per CERC regulation through NLCIL s own 230 kV TIE Lines LILOed at NNTPP.

Follow up issues of previous meetings of SCPSPSR

2.0 Reactive power compensation for Uppur TPS (2X 800 MW) Uppur TPS (2X 800 MW):

2.1 In the 41st SCPSPSR the following system was agreed for evacuation of 2x 800 MW Generation at Uppur TPS (2x800 MW).

A. ATS for UPPUR (2X800MW) project:

- i) Uppur- Virudhnagar 765kV D/C line
- ii) 2X240MVAR, 765kV bus reactors at the Uppur 765kV switchyard.

B. Establishment of 765/400kV S/S at Virudhnagar (For evacuation of power from Uppur and Pooling of Renewable Generation):

- i) 765/400 kV, 2X1500MVA, ICTs
- ii) 765kV Connectivity:
 - a) Virudhunagar- Coimbatore 765kV D/C line with adequate capacity of switchable line reactors at both ends of each line.
- iii) 400kV Connectivity:
 - a) Virudhnagar- Kayathar 400kV D/C line (Quad Moose ACSR Conductor).
 - b) Virudhnagar -Kamuthi 400kV D/C line (Quad Moose ACSR Conductor).

c) Virudhnagar -Thappagundu 400kV D/C line (Quad Moose ACSR Conductor).

- 2.2 Further, it was decided that joint study the reactive compensation requirement at both ends of proposed Coimbatore-Virudhnagar 765kV D/C line would be studied by CTU, TANTRANSCO & CEA..
- 2.3 A meeting was held at CEA on 06.02.2018 and it was decided to have joint study meeting. on 19.04.2018.
- 2.4 Members may discuss.

3.0 Kadaladi Ultra Mega Solar PV Power Project (500 MW)

- 3.1 In the 41st SCPSPSR meeting Implementation of Kadaladi – Kamuthi 400kV D/C line by TANTRANSCO was agreed and it was decided that The requirement of reactive compensation to be finalized in a joint meeting of CEA, CTU and TANTRANSCO.
- 3.2 In the meeting held in CEA on 06.02.2018 it was decided to again carry out a joint study. The joint study meeting is proposed to be held on 19.04.2018.
- 3.3 Members may discuss.

4.0 Power evacuation scheme for the proposed Kundah PSHEP (4 X 125 MW) & Sillahalla Pumped storage HEP Stage –I (4 X 250 MW) project.

- 4.1 In the 41st SCPSPSR meeting, the following scheme was proposed by TANTRANSCO for power evacuation of Kundah Pumped Storage Hydro Electric Project (KPSHEP) – 4X125MW taking in to account the subsequent addition of Sillahalla Pumped Storage HEP Stage I – 4X250MW.

A. With commissioning of KPSHEP (4x125 MW):

- a) Establishment of 400/230 kV Substation with 3X315 MVA or 2X500 MVA ICTs at Parali (near existing Kundah PH III) with the following 400 kV and 230 kV connectivity.
- b) 400 kV connectivity:
- i) 400 kV D/C line from Parali – Karamadi 400 kV D/C line running on D/C tower up to location no. 57 (Hilly terrain area) and subsequently running on 400 kV MC tower (with four circuits) up to Karamadai 400/230 kV S/S (in Plains area), which will to accommodate Sillahalla PS – Karamadi 400 kV D/C line

(The lines will have HTLS conductor. The 400 kV D/C lines will be erected utilizing the existing corridor Kundah PH III – Karamadai 230 kV S/C line)

- c) 230 kV connectivity
 - i) KPSHEP - Parali 3 S/C lines on multi circuit towers [(4 ckts) sharing the 4th circuit for in addition to the existing Kundah PH II to Kundah PH III 230 kV S/C line utilizing that 230 kV corridor.
 - ii) The existing KPSHEP - Kundah PH III , 230 kV D/C line to Parali 400/230 kV SS. And utilizing the existing 230Kv corridor upto Parli.

B. With commissioning of Sillahalla Pumped Storage – Stage I HEP – 4x250MW:

- i) Silahalla PSHEP (Stage I) - Parali 400kV D/C line .
 - ii) Parali - Karamadai 400 kV D/C line , erected by utilising Kundah PH II – Arasur 230 kV S/C line corridor in hilly terrain.
 - iii) 400 kV D/C line using the Multi circuit tower (in plain area)from location 57 to Karamadal 400 KV substation to be commissioned matching with commissioning of Sillahalla PSHEP Stage-I (4x250 MW)
- 4.2 In the meeting it was decided that detail study would be carried out jointly by CEA, CTU & TANTRANSCO and the proposal with study results would be discussed in next meeting of Standing Committee.
- 4.3 In the meeting held in CEA on 06.02.2018 it was decided to carry out joint study. The joint study meeting is proposed to be held on 19.04.2018.
- 4.4 Members may discuss.

5.0 Provision of exclusive 220kV feeder to CPRI, Hyderabad for their online 350 MVA short circuit test facility

- 5.1 CPRI had proposed establishment of 350 MVA short circuit test facility at their existing UHVRL (Uppal, Hyderabad) for testing of distribution class transformers(33kV&11kV). The facility will be getting power supply by LILO of 220kV Ghanapur-Hayatnagar (LILO length 4Km) line at CPRI, Uppal.
- 5.2 The issue was discussed in 41st meeting of Standing Committee on Power System Planning in Southern Region (SCPSPSR) held on 22.09.2017 wherein, CPRI was advised to carry out the dynamics studies and submit the report to CEA.
- 5.3 A meeting was held in CEA on 25.10.17 and CPRI has submitted the report including dynamic studie results. In the meeting it was decided that CPRI may connect their online 350 MVA short circuit test facility with the grid through LILO of Ghanapur-Hayathnagar 220kV line considering the suggestions given by CTU and POSOCO. Further, CPRI was advised to formulate operating procedure approved by SRPC for getting connected with grid while carrying out short circuit testing of transformer.
- 5.4 Members may note.

6.0 Proposal of erection of 125 MVAR Bus Reactor at other end instead of 400 kV GIS Srisailam Left Bank Hydro Electric Station (SLBHES)

- 6.1 In the 39th Standing committee meeting, installation of the 400kV, 1x125MVAR, Bus reactor at Srisailam Left Bank Hydro Electric Station(SLBHES) 400kV GIS substation was approved. Representative of TSTRANSCO stated that during the 31st TCC& 32nd SRPC meetings held on 21/22.08.2017, it was informed that erection of Bus reactor was not feasible due to space constraint at SLBHES.
- 6.2 In the 41st SCPSPSR it was decided to study and examine the installation of Bus reactors at other end of the substations connecting SLBHES GIS substation in joint meeting.
- 6.3 In the meeting held in CEA on 06.02.2018, it has been decided that a team comprising officers from CEA, CTU and TSTRANSCO would visit SLBHES switchyard to explore the feasibility to accommodate the reactor (125 MVA).
- 6.4 Member may discuss.

7.0 Establishing 400/220 kV sub-station, (3 x 500 MVA) at Mylasandra (Electronic City) in Bangalore

- 7.1 In the 41st SCPSPSR, KPTCL had requested for reconductoring of Somanahalli-Kolar 400kV D/C line with Quad Moose ACSR conductor (replacing existing Twin Mosse ACSR conductor) and for establishment 400/230 kV substation at Mylasandra substation (Electronic city) with 3x500MVA, 400/230kV ICTs.
- 7.2 LILO of Somanahalli-Kolar S/C line at Mylasandra sub-station
- 7.3 POSOCO informed that long shut down of Somanahalli-Kolar 400kV line is not possible and reconstruction would be very difficult due to RoW Constraint. In the meeting it was decided that CEA, CTU, POSOCO and KPTCL may carry out System Studies jointly and explore various alternate options.
- 7.4 A follow up meeting was held on 6th February 2018 at CEA, New Delhi to discuss various issues in the 41st Standing Committee Meeting. During the meeting PGCIL expressed concern on reconductoring of existing Kolar-Somanahalli 400kV D/C line (with Twin Moose ACSR conductor), in the view of power supply and Right of Way (ROW) issues in the vicinity. Hence, it was suggested to explore possibility of extending an additional source like LILO of the existing 400kV Somanahalli-Hosur S/C Twin Moose line to proposed 400/220kV Mylsandra.
- 7.5 In this context, KPTCL conducted load flow study duly examining the alternate possible 400 kV connectivity to proposed Mylasandra (results enclosed at Annexure-I)

- 7.6 In a meeting held in CEA on 12.04.2018, KPTCL informed that PGCIL is constructing Dharmapuri - Somanahalli 400kV D/C line (with Quad Moose ACSR conductor) by utilizing the existing corridor of Hosur-Somanahalli 400kV S/C line S/C liune (with twin moose ACSR conductor) using MC towers (with 4 ckts) suitable for carrying 2 Nos. D/c line with twin moose ACSR conductor and 2 Nos. D/c line with Quad moose ACSR conductor). PGCIL will utilize only 3 circuits [two circuits with QM conductor for the proposed 400 kV Dharmapuri-Somanahalli 400kV D/C line and one circuit with twin moose conductor for existing Hosur-Somanahalli 400 kV S/C line].
- 7.7 KPTCL had proposed to construct LILO of one circuit of proposed Dharmapuri-Somanahalli 400kV D/c line (PGCIL line) at 400 kV Mylasandra sub-station.
- 7.8 The above connectivity will provide four nos of 400 kV outlets to proposed 400 kV Mylasandra with 2 nos of 400 kV lines to Somanahalli (one Twin and one Quad) and 1 no of 400 kV line each to Kolar (Twin line) and Dharmapuri (Quad line).
- 7.9 In view of the above final connectivity of the Mylasandra S/S as follow:
- i. LILO of single circuit of Dharmapuri-Somanahalli 400kV D/C (quad Moose) at Mylasyandra
 - ii. LILO of single circuit of Kolar-Somanahalli 400kV S/C (Twin Moose) at Mylasyandra

Members may discuss

Transmission planning proposals by Karnataka

- 8.0 Establishing 2x500 MVA, 400/220 kV sub-station at Dommasandra in Bengaluru city**
- 8.1 KPTCL informed that they are planning to establish 400/220 kV sub-station at Dommasandra (400/230kV, 2x500MVA ICTs) in Bengaluru city with LILO of existing 400 kV Kolar-Somanahalli S/C line (with Twin Moose ACSR conductor)line. The proposed sub-station is intended to relieve loads of 400kV Kolar & proposed 400 kV Mylasandra sub-station, to reduce the loading of 220 kV lines and to meet the future load growth in the vicinity.
- 8.2 Load flow study has been carried out with the following transmission scheme for proposed 400 kV Dommasandra.
- i. LILO of Kolar – Somanahalli S/C (with Twin Moose ACSR conductor) 400 kV line at prop. Dommasandra.
 - ii. 2 X 500 MVA, 400/220 kV Transformers.
 - iii. LILO of Somanahalli - Malur 220 kV D/C line between proposed 220kV EXORA and Malur sub-station (With this line arrangement, there will be 220

kV DC connectivity between Dommasandra & EXORA, 220 kV SC connectivity from Dommasandra, each to Sarjapura and Malur).

- iv. 220 kV, 1000sqmm UG cable link between 220 kV VT Park substation and 220 kV EXORA sub-station (proposed).

8.3 It is to be mentioned that the proposed 400 kV Dommasandra sub-station is feasible subject to strengthening of upstream Kolar-Somanahalli 400 kV S/C line (with Twin Moose ACSR conductor).

8.4 In a meeting held in CEA on 12.04.2018, KPTCL informed that for strengthening of Dommasandra sub-station one 400kV S/C line from Somanahalli to Dommasandra has also been proposed. Accordingly, the final 400kV connectivity of Dommasandra would be as follows:

- i. LILO of Kolar - Mylasyandra 400kV S/C line (with Twin Moose ACSR conductor) at Dommasandra
- ii. Somanahalli - Dommasandra 400kV S/C line (with Twin Moose ACSR conductor)

Members may discuss

9.0 Intra-state transmission projects proposed for Green Energy Corridor Ph-II:

9.1 KPTCL vide their letter dated 21 Feb 2018 has informed following Intra-State transmission projects planned in the state for evacuation of large scale RE generation are proposed under Green Energy Corridor Phase-2.

SI No	Project Description
1	Establishing 2X500 MVA, 400/220/110kV substation at Yalwar in B.Bagewadi Taluk, Bijapur district.
2	Establishing 2X500 MVA, 400/220kV substation at Lokapur in Bagalkot district.
3	Providing additional 400kV link with proposed 400/220 kV Doni sub-station by LILO of existing Narendra- Davanagere 400 kV D/C line (with twin moose ACSR conductor) at Dhoni sub-station.
4	Establishing 2X100MVA, 220/110 kV substation at Ron in Gadag district.
5	Establishing 2X100MVA, 220/110 kV substation at Savalgi in Bagalkot district.
6	Establishing 2X100MVA, 220/66 kV substation at P.D.Kote in Chitradurga district.
7	LILO of 2nd circuit of the existing Mahalingpura - Kudachi 220 kV D/C at Athani.

8	Conversion of existing 220 kV S/C line to 220 kV D/C line with Drake conductor running between 220 kV stations at Bidnal, Saundatti and Mahalingpura.
9	Strengthening of 220 kV Lingapura-Ittagi-Neelagunda-Guttur S/C line by replacing S/C line with Drake conductor by 220 kV D/C line using Drake conductor.
10	Providing additional 66kV circuit between 220kV Davangere substation and Kukkawada substation for a distance of 13.523 kms with coyote conductor in the existing corridor along with construction of one 66kV terminal bay each at both stations.
11	Providing additional 110kV circuit between 220kV Kushtagi R/S and 110kV Yelburga substation for a distance of 28 kms with Lynx conductor in the existing corridor along with construction of one no 110kV terminal bay each at both stations.
12	<p>A) Reconstruction of 66kV SC idle line on SC towers having Coyote conductor from 66kV Chitradurga to 66kV Pandrahalli substation for a distance of 17.5kms with 66 kV SC line with Drake conductor along with construction of one no 66kV terminal bay each at both stations.</p> <p>B) Providing additional 66kV circuit between H.D.Pura tap point and H.D.Pura Substation for a distance of 10kms with Coyote conductor to provide LILO arrangements at 66/11 kV H.D.Pura substation along with construction of one no 66kV terminal bay at H.D.Pura substation.</p>

9.2 KPTCL has carried out load flow studies incorporating above proposal (results enclosed at Annexure -II)

Members may discuss

Transmission planning proposals by Tamil Nadu

10.0 Establishment of Arni 400/230kV substation in Villupuram region by upgrading the existing 230 kV Arni SS.

10.1 TANTRANSCO vide their letter CE/Plg.&R.C/SE/SS/EE-I/AEE1/F.42nd SCM Agenda/D.72/2018 dated 17.03.2018 has informed that Upgradation of existing Arni 230/110 kV SS into 400/230/110KV SS is very much essential due to the following reasons:

- i. The 230KV Arni is located in the load centre.
- ii. Presently, out of 5 Nos. 230KV feeders of 230KV Arani SS, only 230KV Arni-Echur and Arni- Sriperumpudur feeders are serving as effective source .

- iii. In case of outage of one of the above 230 KV feeders , N-1 contingency condition could not be satisfied due to overloading of the other healthy feeder.
- iv. On establishment of Arni 400 kV SS , it will become the reliable source for the nearby 230 KV substations .

10.2 In view of the above TANTRANSCO proposed following schemes:

Establishment of 400 /230/110 kV SS with 3x315 MVA 400/230 KV ICT capacity by upgradation of the existing 230/110 kV Arani SS in the same premises with 2x80 MVA Bus Reactors retaining the existing 230 kV & 110 kV connectivity

400 KV CONNECTIVITY:

- i. 1. LILO of one circuit of Ariyalur - Kalivanthapattu 400 kV DC line at Arni (quad moose conductor).
- ii. Arni- Thiruvalem 400 kV S/C line on D/C tower (Quad Moose ACSR Conductor)

10.3 The system studies conducted by TANTRANSCO is enclosed at Annexure-III

Members may discuss.

11.0 Enhancement of 400/230 kV ICT capacity by erecting additional 1 X 500 MVA ICT at Thiruvalem 400/230 kV SS.

11.1 TANTRANSCO vide their letter CE/Plg. &R.C/SE/SS/EE-I/AEE1/F.42nd SCM Agenda/D.72/2018 dated 17.03.2018 has informed that the existing ICT loading on existing ICT (400/230kV, 2x315 MVA) reached its maximum capacity.

11.2 TANTRANSCO requested for Provision of additional 1x 500 MVA, 400/230 kV ICT at Thiruvalem 400/230 kV SS.

11.3 The system studies conducted by TANTRANSCO is enclosed at Annexure-IV

Members may discuss

12.0 Introduction of 230 kV level at Ariyalur 765/400 kV substation

12.1 TANTRANSCO, vide their letter CE/Plg. &R.C/SE/SS/EE-I/AEE1/F.42nd SCM Agenda/D.72/2018 dated 17.03.2018 has proposed to introduce 230 kV level at the sanctioned Ariyalur 765KV substation with 400/230kV, 2x500 MVA ICT to connect the nearby 230KV load substations.

12.2 Following scheme was proposed:

ICT

- i) 400/230 kV, 2x500 MVA

230 kV links

- i) Ariyalur- Sankarapuram 230 kV D/C line
- ii) Ariyalur- Thiruvannamalai 230 kV S/C line on D/C tower.
- iii) Ariyalur-Villupuram 230 kV S/C line on D/C tower

12.3 The system studies conducted by TANTRANSCO is enclosed at Annexure-V
Members may discuss

13.0 Introduction of 230 kV level at Virudhanagar 765/400 kV substation

13.1 TANTRANSCO, vide their letter CE/Plg. &R.C/SE/SS/EE-I/AEE1/F.42nd SCM Agenda/D.72/2018 dated 17.03.2018 has proposed following scheme

ICT

- i. 400/230 kV, 2x500 MVA

230 kV links

- i. Virudhanagar -Savaspuram 230 kV S/C line on D/C tower
- ii. Virudhanagar -Kinnimangalam 230 kV S/C line on D/C tower
- iii. Virudhanagar -Thummakundu 230 kV S/C line on D/C tower
- iv. Virudhanagar -Srivilliputtur 230 kV S/C line on D/C tower

13.2 The system studies conducted by TANTRANSCO is enclosed at Annexure-VI
Members may discuss

14.0 2nd circuit with 230kV UG cable between Kalivanthapattu 400 kV SS (PGCIL) and Tharamani 230 kV substation of TANTRANSCO

14.1 TANTRANSCO, vide their letter CE/Plg. &R.C/SE/SS/EE-I/AEE1/F.42nd SCM Agenda/D.72/2018 dated 17.03.2018 has proposed Kalivanthapattu- Tharamani 230 kV 2nd circuit with UG cable.

14.2 This proposal has been evolved mainly to provide an alternate connectivity through UG cable to avoid the delay in normalisation of supply during natural calamities at Tharamani 230/110 kV substation which is mainly feeding the southern part of Chennai.

14.3 TANTRANSCO has requested for one 230 kV bay at Kalivanthapattu PGCIL 400 kV SS for the erection of the above line.

Members may discuss

15.0 Modification for the already approved Transmission System associated with NCTPS Stage –III (1x800MW) and ETPS Replacement (1x660 MW)

15.1 The following modification in Transmission System associated with NCTPS Stage –III (1x800MW) and ETPS Replacement (1x660 MW), as proposed by TANGEDCO to reduce the cost of investment without losing reliability was approved in the 41st Standing Committee on Power System Planning of Southern Region:

- i. NCTPS (Stage III switchyard) -North Chennai Pooling station 765kV S/C line
for power evacuation
- ii. ETPS (Replacement switchyard) -North Chennai Pooling station 765kV S/C
line for power evacuation
- iii. North Chennai (Stage III) - Ennore (Replacement) with 765 kV S/C lines (Hexa
Zebra conductor) instead of 765 kV D/C lines.

15.2 TANTRANSCO vide their letter dated Lr.No.CE/Plg.&R.C/SE/SS/EE-I/AEE1/F.42nd SCM Agenda/D. 75 dated 20.03.2018 informed that the NCTPS Stage-III project will be ready by the end of 2019 and the commencement of ETPS Replacement project will take time. Hence, the following further modification is proposed:

- i) NCTPS (Stage III) Switchyard – North Chennai Pooling station 765kV D/C
line for power evacuation and reliability.
- ii) The above line will be LILOed at ETPS (Replacement) switchyard later to
restore the approved connectivity as stated in para 12.1.

Members may discuss

Transmission planning proposals by Andhra Pradesh

16.0 Proposal for evacuation of 12 x 80 MW (960 MW) power from Polavaram Hydro Electric Project of APGENCO in East Godavari district

16.1 APTRANSCO, vide their letter dated CE(IPC&PS)/SE(PS)/DE(SS<SS)/ADE-3/F.polavaram/D.no 335/2017 dated 29.11.2017 has informed that APGENCO is setting up 12 x 80 MW (960 MW) Polavaram Hydro Electric Project in East Godavari district.

16.2 In this regard APTRANSCO has proposed the following dedicated Transmission Scheme for evacuation of 960 MW (12 x 80 MW) power from Polavaram Hydro Electric Project of APGENCO in East Godavari district.

- KV Kota - Polavaram Hydro Electric Project 400 kV D/C line (79km) with Quad Moose conductor.

16.3 The system studies conducted by APTRANSCO is enclosed at Annexure-VII

Members may discuss

17.0 Proposal for reconfiguration at 400/220kV Uravakonda SS with isolation of 220kV Bus arrangements instead of approved 400/220kV Uravakonda -2 SS

17.1 The following transmission scheme was approved in the 40th Standing Committee Meeting for wind power projects at 400/220kV Uravakonda -2

- i. Erection of a 400/220kV Substation at Uravakonda -2 with 400/220kV 4x315 MVA ICTs.
- ii. Erection of Uravakonda - Uravakonda -2 400kV D/C line (with Quad Moose ACSR conductor)
- iii. Erection of 400kV, 1x125 MVAR Bus reactors at 400/220kV Uravakonda -2 SS.

CEA recommended for 400/220KV, 3 x 500 MVA transformers (in place of 400/220kV 4 x 315 MVA transformers) at Uravakonda -2 (Kanekal) substation.

17.2 APTRANSCO requested for reconfiguration at 400/220kV Uravakonda SS with isolation of 220kV Bus arrangements instead of approved 400/220kV Uravakonda -2 SS

17.3 The APTRANSCO carried out system studies for reconfiguration with isolation of bus arrangements at 220kV and providing 400/220kV, 3 x 500 MVA ICTs at 400kV bus of existing 400/220kV Uravakonda SS instead of approved Uravakonda-2 SS in view of delay in construction of 400/220kV Uravakonda -2 SS.

17.4 It is observed that, there are no changes observed in power flows with the proposed reconfigurations with isolation of 220kV Bus arrangements with 400/220kV, 3 x 500 MVA ICTs at 400kV bus of existing 400/220kV Uravakonda SS instead of separate 400/220KV Uravakonda II SS when compared to the approved (results are enclosed at Annexure -VIII)

Members may discuss

Transmission planning proposals in Kerala

18.0 Materialization of 400/220 kV Multi Circuit Multi Voltage feeder from 400 kV substation, Madakkathara of M/s KSEBL to 400 kV substation at Kozhikode owned by M/s PGCIL- Request for two additional 400 kV bays at 400 kV substation, Kozhikode

18.1 North Trissur (madakkathara)-Kozhikode(Areakode) 400kV D/C line (with Quad Moose ACSR conductor) was approved in the 30th meeting of Standing Committee on Power System Planning of Southern Region.

18.2 As per 39th SCPSPSR, 400 kV North Trissur (Madakkathara)- Kozhikode (Areakode) D/C line (with QM ACSR conductor) was decided to be taken up by KSEBL.

18.3 KSEBL, vide their letter D(T&SO)/PSE/SCPSP/2017-18/413 dated 23.01.2018 has informed that at present the work has been awarded and project is under execution. KSEB requested that 2 nos. 400 kV bays may be spared at 400 kV substation, Kozhikode by Powergrid for termination of Madakathara- Kozhikode 400kV D/C line being implemented by KSEBL.

Members may discuss.

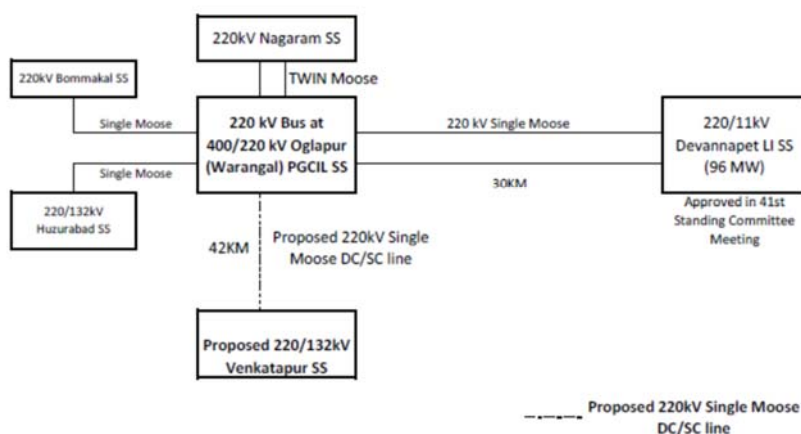
Transmission planning proposals in Telangana

19.0 Proposal for erection of 220kV D/C on S/C line (with ACSR Single Moose) from 400/220kV Oglapur (PGCIL) SS to proposed 220/ 132kV Venkatapur SS (42 KM) in Jayashanker Bhupalapally District -Load flow studies

19.1 TSTRANSCO has proposed the erection of 220kV D/C on S/C line (ACSR Single Moose) from 400/220kV Oglapur (PGCIL) SS to proposed 220/ 132kV Venkatapur SS (42 KM) in Jayashanker Bhupalapally

19.2 The load flow studies for the proposal has been carried out based on the field feasibility report (Results enclosed at Annexure-IX)

Proposal for erection of 220kV DC/SC line (ACSR Single Moose) from 400/220kV Oglapur (PGCIL) SS to proposed 220/132kV Venkatapur SS (42KM)

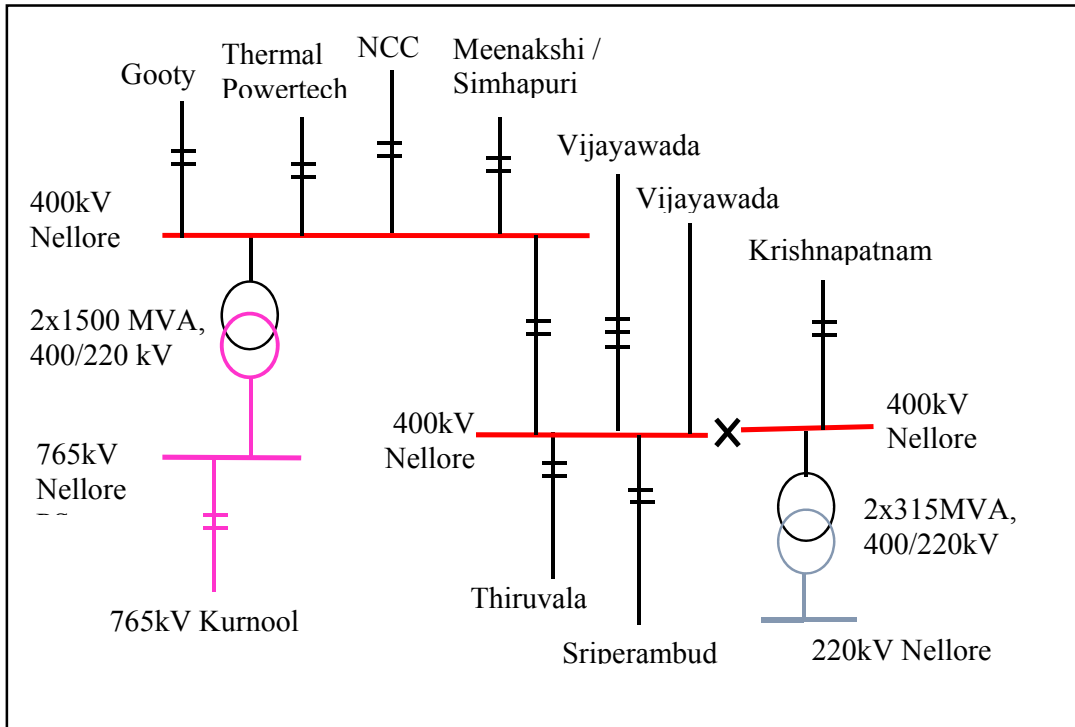


Members may discuss.

Proposals by Central Transmission Utility:

20.0 High loading of Nellore – Nellore PS 400kV (Quad) D/c line:

- 20.1 The matter pertaining to high loading on Nellore – Nellore PS 400kV (Quad) D/c line on the healthy circuit on outage of one circuit was referred by POSOCO in its operational quarterly feedback reports and the same was discussed in the 41st Standing Committee meeting held on 22/09/2017 and 33rd SRPC meeting held on 16.02.2018. During the SRPC meeting it was decided that the issue may be taken up for discussion in the upcoming Standing Committee meeting. Further POSOCO in the operational feedback report for Q3 of 2017-18 has stated that high short circuit level are observed at Nellore (PG) & Nellore (AP) 400kV substation. The rise in short circuit levels at these substations were envisaged with the addition of the generations in Krishnapatnam area of Andhra Pradesh. Further while planning the power evacuation transmission system from Krishnapatnam area, it was also planned that the interconnection of Nellore 765/400kV pooling station & Nellore 400kV substation may be bypassed with the increase in the short circuit levels.
- 20.2 In this regard, connectivity arrangement at Nellore 765/400kV PS, Nellore (PG) 400kV and Nellore (AP) 400kV substations is as enclosed as below.



20.3 To address both the issues of critical loading and the high short circuit levels, following alternatives have been studied (results enclosed at Annexure-X):

Alternative 1: Opening of Nellore (PG) – Nellore PS 400kV (Quad) D/c line

Alternative 2: Bypassing the Nellore (PG) through interconnection of Nellore PS - Nellore (PG) 400kV D/c (Quad) line (6Km) and Nellore (PG) – Thiruvallam 400kV D/c (Quad) line (175Km) at Nellore (PG).

20.4 It may be seen that in both the above alternatives the interconnection between 400 kV buses of Nellore (PG) and Nellore (PS) gets removed.

20.5 Power System Studies has been carried out considering peak load of ~46500MW for SR and generation as ~38600MW in present time frame. Despatch of 3436 MW from the IPP generations has been considered at Nellore PS (LTA quantum : NCC Power – 740 MW + Thermal Powertech – 1240 MW + Simhapuri – 546 MW + Meenakshi – 910 MW).

20.6 The short circuit study results as given below shows that fault current levels at Nellore PS, Nellore (PG) 400kV and Nellore (AP) 400kV substations get reduced and remain under their designed value under both the alternatives.

Table I : 3-Ph short circuit fault level

Substations	3-Ph short circuit fault level (kA)			
	Designed value	Base Case	Alternative-1	Alternative-2
Nellore 765/400 kV PS	50	45	25	30

Nellore (PG)	40	45	26	23
Nellore (AP)	40	45	26	23

- 20.7 Further from load flow studies, results enclosed at Exhibit-1, it may be observed that under the alternative-1, the 765/440kV ICT at Nellore765/400kV PS gets overloaded under the “N-1” contingency, as the power pooled at Nellore PS 400 kV have only two paths one towards Gooty through Nellore PS – Gooty 400 kV D/c line and other towards 765 kV bus through 765/400 kV transformer. Therefore, this alternative shall require augmentation of transformation capacity through 1x1500 MVA 765/400 kV transformer.
- 20.8 In the 2nd Alternative, attempts have been made to increase the number of outlets from Nellore PS 400 kV bus (which was primary reason for transformer augmentation in Alternative – 1). This has been achieved by direct connection of Nellore (PS) – Nellore (PG) and Nellore (PG) – Thiruvalem 400 kV D/c lines (both which are constructed with quad conductors) to form Nellore (PS) – Thiruvalem 400 kV (Quad) lines. As the Nellore (PS) – Nellore (PG) is very small in length the new configuration does not have excessive length. The load flow study results for normal and contingency condition is attached at Exhibit – 1.
- 20.9 The summary of the load flows are given in the table below

Table II : Summary of load flow at Nellore PS, Nellore (PG) and Nellore (AP)

Substation	Connectivity to bus	Power flow		
		Base Case	Alt. 1	Alt. 2
Nellore PS 400kV	2x1500 MVA, 765/400kV ICT	2x333	2x1040 1880(N-1)	2x470
	Gooty 400kV D/c line	2x335	2x670	2x400
	Nellore (PG) 400kV D/c (Quad) line	2x1045 2030(N-1)	-	-
	Thiruvalem 400kV D/c (Quad) line	-	-	2x840
	NCC 400kV D/c (Quad) line	-2x370	-2x370	-2x370
	Thermal Powertech 400kV D/c (Quad) line	-2x620	-2x620	-2x620
	SEPL/MEPL 400kV D/c (Quad) line	-1450	-1450	-1450
Nellore (PG) 400kV	Nellore PS 400kV D/c (Quad) line	-2x1045 -2030(N-1)	-	-
	Thiruvalem 400kV D/c (Quad) line	2x700	2x400	-
	Sriperumbudur 400kV D/c line	2x535	2x360	2x440
	Nellore (AP) 400kV bus Extn	128	-450	-170
	Vijaywada 400kV D/c line	-2x130	-2x270	-2x180
	Vijaywada 400kV S/c line	-130	-270	-180
	Vijaywada TPS 400kV S/c line	-130	-275	-180
Nellore (AP) 400kV	Krishnapattinam 400kV D/c line	-2x200	-2x380	-2x305
	Nellore (PG) 400kV bus extn	-128	450	170
	2x315 MVA, 400/220 kV ICT	2x270	2x155	2x220

- 20.10 Therefore, it has been observed that alternative – 2 gives solution for the concerns viz. (i) overloading of Nellore (PG) – Nellore (PS) line and (ii) control of short circuit levels at Nellore (PG) and Nellore (AP). Further, the solution also does not involve incurring any additional expenditure as the Nellore – Nellore PS 400kV D/c (Quad) lines and Nellore – Thiruvvelam 400kV D/c (Quad) lines are terminating in the same diameters and can be bypassed at Nellore (PG).
- 20.11 It is proposed to bypass Nellore PS – Nellore 400kV D/c (Quad) line and Nellore – Thiruvvelam 400kV D/c (Quad) line at Nellore (PG) for Nellore PS – Thiruvvelam 400kV D/c (Quad) line.
- 20.12 Members may discuss.

21.0 Proposal for Grant of Connectivity to NLC India Limited (TPS-II 2nd Expn – 2x660 MW) in Cuddalore, Tamil Nadu and to control high short circuit level in Neyveli Generation complex.

- 21.1 NLC India Ltd. has applied for connectivity of their Neyveli TPS-II 2nd Expn (2x660 MW) generation project in Cuddalore, Tamil Nadu in the month of March, 2017. The details of the application are given below:

Sl. No	Applicant	Location	Date of Application	Start Date (As per application)	Connectivity Sought (MW)	Latitude/ Longitude
1.	NLC India Ltd. (TPS-II 2nd Expn)	Cuddalore, Tamil Nadu	01.03.2017	1 st April, 2021	1320	11 ^o 34' N to 11 ^o 35' N 79 ^o 26' E to 79 ^o 27' E

- 21.2 As per the application NLC India Ltd sought connectivity for TPS-II 2nd Expn- 2x660MW at one of the following nodes :
- (i) 400kV TPS-II switchyard (or)
 - (ii) 400kV TPS-II Expn. switchyard (or)
 - (iii) 400kV TPS-I Expn. switchyard at Neyveli.
- 21.3 The proposal for grant of connectivity & LTA to IPPs in Southern region was included in the agenda of the 22nd Southern Region constituents meeting regarding Connectivity/LTA Applications of IPPs in SR circulated vide our letter dated 31.07.2017. However, the 22nd Southern Region constituents meeting regarding Connectivity/LTA Applications of IPPs in SR could not be held. Subsequently, the proposal for grant of connectivity to NLC India Ltd (TPS –II 2nd Expn - 2x660 MW) was circulated vide letter C/CTU-Plg/SR/Connn/ dated 21.12.2017, for comments / observations from Southern Region constituents. In response observations have been received pertaining to high fault current at existing Neyveli generation complex,

constraints bay availability for proposed connectivity transmission system, system reliability etc. from NLC India Ltd., POSOCO and TANTRANSCO.

In view of the above constraints, proposal for connectivity to NLC India Ltd (TPS-II 2nd Expn. - 2x660 MW) has been revised and details of the same are given at subsequent paras.

- 21.4 The connectivity for the TPS-II 2nd Expn (2x660 MW) has now been considered at Nagapattinam 765/400kV Pooling station. the short circuit study results conducted for the Neyveli Generation complex shown at Table-IV wherein it is observed that fault current are higher in base case (Case-1) as well as with the TPS-II 2nd Expn generation project (Case-2).

Case-1 : Base Case

Case-2: Base Case + connectivity of TPS-II 2nd Expn at Nagapattinum 400kV switchyard

Results are enclosed at annexure -20

- 21.5 To control the Short circuit current at Neyveli Generation complex, following is proposed :

- Removal of the LILO of Neyveli TS-II – Pondicherry 400kV S/c line at NNTPS (replacement) after commissioning of NNTPS – Ariyalur 400kV D/C (Quad) line.
- The LILOed portion may be extended to Neyveli (TANTRANSCO) 400/230kV substation through 400kV D/c line.

This proposal shall lead to the following rearrangement of the transmission system

- Neyveli TS-II – Pondicherry 400kV S/c line (removal of LILO of Neyveli TS-II – Pondicherry 400kV S/c line at NNTPS)
- NNTPS – Neyveli (TANTRANSCO) 400kV D/c line (through extension of LILOed portion to Neyveli (TANTRANSCO))

- 21.6 With the above rearrangement, in addition to case-2, (case-3) the fault levels are still on higher side and needs further rearrangement at the Neyveli Generation complex, the study results are provided in the Table-IV.

- 21.7 Neyveli –Trichy 400kV S/c line was LILOed at Nagapattinam for establishment of Nagapattinam 765kV pooling station (initially @400kV) to facilitate evacuation of large numbers of generation projects in Nagapattinam/Cuddalore area on Tamil Nadu with the provision to bypass the LILO in case of higher short circuit levels. The same was agreed during the 31st Standing Committee meeting of Southern Region held on 16/09/2010. Further in 36th Standing Committee meeting of Southern Region held on 04/09/2013, LILO of 2nd ckt of Neyveli – Trichy 400kV S/c line at Nagapattinam which

was provided as contingency arrangement for evacuation of power for ILFS was also agreed to be bypassed as per the requirements.

21.8 Accordingly, these LILOs are to be bypassed / restored and both LILO sections may be extended to 400kV switchyard of Neyveli TPS-II 2nd Expn to form Neyveli TPS-II 2nd Expn – Nagapattinam 400kV 2XD/c line as part connectivity transmission system. With above arrangements revised transmission system would be as follows :

- Neyveli TS-II – Trichy 400kV S/c line (through removal of LILO)
- Neyveli TS-I Expn – Trichy 400kV S/c line (through removal of LILO)
- Neyveli TS-II 2nd Expn – Nagapattinam 400kV 2XD/c line (extension of both LILO sections from Nagapattinam pooling station to Ney TS-II 2nd Expn)

21.9 With the above rearrangement, in addition to case-3, (case-4) the fault levels are within limit, the study results are provided in the table-IV.

21.10 The summary of the short circuit fault levels in Neyveli generation complex is given below in table.

3-Ph fault level (in kA) at 400kV Switchyard	TPS-I Expn	TPS-II	TPS-II Expn	NNTPS	TPS-II 2nd Expn	ILFS	Nagapattinam PS
Designed SC fault level of Substation / Gen. Station	40	40	40	50	63 (PROPOSED)	50	50
Case-1: Base Case	36	52	48	50	-	23	32
Case-2	36	54	50	51	24	25	38
Case-3	32	41	39	29	23	24	36
Case-4	24	33	32	29	17	16	19

21.11 From above table it may be observed that with the Connectivity and rearrangement proposal at Neyveli Generation complex, the short circuit levels are well within their designed limits of respective switchyard. Further the existing / proposed transmission system is adequate for immediate evacuation and transfer of power from the Neyveli generation complex and the generations connected at Nagapattinam pooling station, load flow plots given at Annexure-1.

21.12 Accordingly proposed modification in existing system to control high short circuit current in Neyveli generation complex and Connectivity Transmission System for NLC India Ltd. (TPS-II 2nd Expn) may be summarized as :

- Neyveli TS-II – Pondicherry 400kV S/c line (removal of LILO of Neyveli TS-II – Pondicherry 400kV S/c line at NNTPS)
- NNTPS – Ney (TANTRANSCO) 400kV D/c line (through extension of LILOed portion to Ney (TANTRANSCO))

- Neyveli TS-II – Trichy 400kV S/c line (through removal of LILO at Nagapattinam 765/400kV S/s)
- Neyveli TS-I Expn – Trichy 400kV S/c line (through removal of LILO at Nagapattinam 765/400kV S/s)

Connectivity Transmission System for NLC India Ltd. (TPS-II 2nd Expn) :

- NLC India Ltd. (TPS-II 2nd Expn) – Nagapattinam 400 kV 2xD/c line (through extension of LILO sections of Ney TS-II / Ney TS-I Expn – Trichy 400kV lines at Nagapattinam to Neyveli TPS-II 2nd Expn) along with the line bays at generation switchyard.
- 1x125 MVAr bus reactor at generation switchyard.
- Switchyard to be designed with 63kA Short Circuit level.

21.13 As per the provisions of Connectivity Regulations, 2009, the grant of Connectivity does not entitle an applicant to inter-change any power with the grid, therefore, the applicant is to apply for the LTA to assure power evacuation & transfer to its firm/target beneficiaries.

21.14 Members may discuss.

22.0 Conversion of fixed line reactors to switchable line reactors in SR

22.1 In 39th meeting of SCPSPSR, held on 29.12.2015, conversion of fixed line reactors into switchable line reactors for following lines along with few other lines was agreed.

Sl. No	Transmission line	Length	Reactor		Agreed Proposal
			Sending end	Receiving end	
1	Gazwel – Hyderabad-II	62.5	-	50	Line Reactor at Hyderabad end to be made switchable
2	Malakaram – Hyderabad-II	28	-	50	Line Reactor at Hyderabad to be made switchable
3	Trichy – Nagapattinam I	159	50	-	Line Reactor at Trichy to be made switchable
4	Trichy – Nagapattinam II	159	63	-	Line Reactor at Trichy to be made switchable

22.2 However, during the execution of the project the following has been observed

- i. For Hyderabad – Malkaram 400kV line, adequate electrical clearance is not available for putting 400kV circuit breaker to convert the fixed line reactor into switchable line reactor. Various alternatives have been examined and it is observed that conversion of fixed line reactor into switchable line reactor is not feasible.

Accordingly, it is proposed to retain line Reactor at Hyderabad end for Hyderabad – Malkaram 400kV line as fixed line reactor.

- ii. For Hyderabad – Gajwel 400kV line, it is observed that enough phase to ground clearance is not available between the line and Reactor bushing in the existing layout. However, requisite clearance can be achieved by inclusion of standard gantry towers and 1 no. of standard beam.

Accordingly, it is proposed to implement the same considering the above additional infrastructure.

- iii. Trichy – Nagapattinam 400kV lines have 50 MVAR and 63 MVAR line reactors in the two ckts at Trichy end. In the referred minutes the conversion of 50 MVAR line reactor on ckt-I and 63 MVAR line reactor on ckt-II has been recorded for conversion to switchable line reactors. As per the nomenclature adopted by RLDC and our site, 50 MVAR line reactor on ckt-II and 63 MVAR line reactor on ckt-I. The same may please be noted.

Members may discuss.

23.0 Establishment of Tirunelveli GIS Pooling Station under the scheme “Green Energy Corridors ISTS – Part-A” – name/location change to Tuticorin-II GIS.

23.1 The Tirunelveli 400/230kV GIS Pooling Station has been agreed under “Green Energy Corridors ISTS – Part-A” in the 36th meeting of Standing Committee on Power System Planning of SR held on 04/09/2013 and 23rd SRPC meeting held on 26/10/2013. However, despite all efforts, the required land for establishing of pooling station could not be acquired in Tirunelveli district due to high cost of land and the land was acquired in Kovilpatti Taluk which is situated in adjacent Tuticorin District.

23.2 In view of the same, it is proposed that name of the Tirunelveli 400/230kV GIS Pooling Station inter alia under the scope of “Green Energy Corridors ISTS – Part-A” may be changed to Tuticorin-II 400/230kV GIS Pooling station.

23.3 Members may discuss.

24.0 Transmission scheme for NP Kunta Ultra Mega Solar Power park (1500 MW) in Andhra Pradesh

24.1 In the 38th standing committee meeting of SR held on 07.03.15, following transmission scheme for NP Kunta UMSPP (1500 MW) was agreed. It was also agreed that transmission scheme for NP Kunta solar power park shall be implemented in three

phases matching with the generation (Ph-I: 250MW by Dec'15, Ph-II: 750MW by Sep'16 & Ph-III: 500MW by Dec'16).

Phase-I (250 MW)

- Establishment of 3x500 MVA, 400/220KV Substation at NP Kunta Pooling station
- LILO of 400KV Kadapa (Cuddapah) - Kolar S/c line at NP Kunta Pooling station
- 2 nos. 220kV line bays at NP Kunta Pooling Station
- 1x125 MVAR Bus Reactor at NP Kunta Pooling station
- ±100 MVAR STATCOM at 400kV NP Kunta Pooling station

Phase-II (750 MW)

- LILO of Hindupur- Kadapa(Cuddapah) 400kV D/c (quad) line at NP Kunta Pooling station
- 6 nos. 220kV line bays at NP Kunta Pooling Station

Phase-III (500 MW)

- Augmentation of transformation capacity at NP Kunta station with 4th , 1x500 MVA, 400/220kV transformer
- 4 nos. 220kV line bays at NP Kunta Pooling Station

24.2 It is to mention that transmission scheme for NP Kunta Ph-I Generation comprising of LILO of 400kV Cuddapah- Kolar S/c line at NP Kunta PS along with 400/200kV NP Kunta Pooling station is already commissioned in Apr'16 matching with generation schedule.

24.3 Subsequently, M/s APSPCL, SPPD of NP Kunta UMSPP, postponed schedule of NP Kunta Ph-II (750 MW) & Ph-III (500 MW) Generation to Aug'19 & April'18 respectively. As envisaged earlier, NP Kunta Ph-II generation (750 MW) was to come before NP Kunta Phase-III (500 MW) generation, Transmission scheme for NP Kunta Phase-II covers LILO of Cuddapah- Hindupur 400kV D/c (quad) line at NP Kunta PS whereas Phase-III scheme included transformer augmentation only.

24.4 Since NP Kunta Phase-III generation is coming earlier than NP Kunta Ph-II generation now, transmission element associated with NP Kunta Ph-II scheme i.e. LILO of 400kV Cuddapah -Hindupur D/c line (Quad) at NP Kunta PS is needed with the Phase-III generation for transfer of power with reliability and security.

24.5 In view of above, LILO of Hindupur- Kadapa(Cuddapah) 400kV D/c (quad) line at NP Kunta PS, transmission element of NP Kunta Phase-II scheme, may be considered as part of NP Kunta Phase-III generation.

Members may discuss

Operational feedback from POSOCO:

25.0 Continuous high loading of 400kV Nellore-Nellore PS DC line and urgent need for future planning to relieve the corridor :

- a. 400kV Nellore PS-Nellore D/C line is getting severely loaded most of the time without N-1 security. The flow on these lines will further increase with full evacuation of approved LTA and commissioning of MEPL Stage-2 Units. MEPL stage-2 Unit-1 is already synchronized to grid and generating infirm power.
- b. CTU informed in 14th meeting of SR constituents regarding LTA and connectivity that 400kV Nellore PS-Nellore D/C lines have to be opened to control short circuit level of Nellore SS. Also informed that 765kV Nellore PS-Kurnool D/C line and 400kV Nellore PS-Gooty D/C line is sufficient for evacuation of Power from Nellore Complex.
- c. With opening of 400kV Nellore PS-Nellore D/C lines, Evacuation of full LTA approved by CTU may not be possible with N-1 Security criteria satisfying and it may increase loading on ER-SR path, which in turn reduce ER-SR TTC. Same was informed to CTU vide letter dated 1st Dec'17 by POSOCO (Letter enclosed).
- d. CTU recommended, vide letter dated 15.12.2017, for keeping 400kV Nellore-Nellore PS D/C lines in service and whenever one line trips, second circuit has to be opened.(Letter enclosed)
- e. Since the solution recommended by CTU is temporary measure, it is required to plan more evacuation paths to relieve the congestion.

26.0 High flow on 400kV KKNPP-Tirunelveli D/C line after Commissioning of (re-arrangement) of 400kV KKNPP-Tuticorin PS D/C line:

- a. As per the 36th Standing Committee meeting on Power system planning in SR dated: 04th September 2013, the following arrangement has been approved. "Turicorin Pooling station - Tirunelveli section of the agreed Turicorin Pooling station - Kudankulam 400 kV Quad D/c line may be constructed ahead of Kudankulam - 3 & 4 and one of the existing Kudankulam - Tirunelveli 400 kV Quad D/c may be connected to the same making Kudnakulam - Turicorin Pooling station 400 kV Quad D/c line. This arrangement shall facilitate two termination points viz. Tirunelveli & Turicorin Pooling station for evacuation of power from Kudankulam - 1 & 2 and shall avoid operational difficulties in case of any bus fault at either Tirunelveli or Tuticorin pooling stations".

- b. POWERGRID has commissioned above transmission system in 1st week of March 2018. With the commissioning of 400kV Kudankulam-Tuticorin PS D/c (144 Km), more than 80% of power generated from KKNPP (with Both units in service) is flowing 400kV Kudankulam-Tirunelveli D/c section (72.5 km).
- c. With more generation at Coastal Energen and NTPL, there would be further uneven distribution of flow on 400kV KNPP-Tirunelveli and 400kV KKNPP- Tuticorin PS sections. Additionally by commissioning of the new 400 kV lines connecting Tirunelveli wind station to Tuticorin PS will further aggravate the situation.
- d. During the 41st Standing committee meeting of SR, NPCIL stated that the expected commissioning schedule of U#3 is September 2022 and of U#4 is March 2023.
- e. Need to review the evacuation transmission system from KKNPP.

27.0 Continuous high voltage at 400kV Uravakonda SS, 400kV Jammalamadugu SS:

- a. 400kV Uravakonda-Veltoor D/c was kept open for more than six (6) months in 2017-18 due to high voltage at Uravakonda, Jammalamadugu and Kurnool area.
- b. 400kV Uravakonda-Veltoor line is Quad-Moose, 198 Km long and without line reactors at both ends. With open condition of these lines, During High wind power injection at 400kV Uravakoda SS & 400kV Jammalamadugu SS and High Solar power injection at 400kV Ghani SS, 400kV Narnoor-Kurnool(PG) DC line will get loaded heavily without satisfying N-1 Security.
- c. It is observed that voltage at 400kV Uravakonda SS is more than 420kV for 100% of the time and at 400kV Jammalamadugu SS is more than 420kV for 95% of the time.
- d. There is need to plan more bus reactors/line reactor in the line.

28.0 SR Import Limiting constraint on 765/400kV Vemagiri PG ICTs:

- a. Presently, limiting constraint for SR import capability is N-1 of 765/400kV Vemagiri-PG ICTs.
- b. The following transmission system planned from 765kV Vemagiri SS and below
 - i. 765kV Vemagiri-PG- Chilakaluripeta DC line
 - ii. 765kV Chilakaluripeta - Cuddapah D/C line

iii. 400kV Chilakaluripeta- Narsaraopeta(Sattenapalli) (quad) D/C line

iv. 400kV Cuddapah - Madhugiri DC line

c. The planned transmission network may expedited

29.0 High Voltage Nodes

a. The Following sub-stations are facing high voltages most of the time during off peak period

S.No.	Sub-Station	Reactors Approved/Commissioned	Remarks
1	765kV Nizamabad SS	1x240 MVAR in-service	One more reactor may be proposed
2	765kV Kurnool SS	2x240 MVAR approved	May be Expedited
3	765kV Raichur SS	2x240 MVAR approved	May be Expedited
4	765kV Thiruvallam SS	2x240 MVAR approved	May be Expedited
5	765kV Srikakulam SS	1x330 MVAR in service	One more reactor may be proposed
6	400kV Dindi SS	No reactor available	1x125 MVAr bus reactor may be proposed
7	400kV Suryapet SS	No reactor available	1x125 MVAr bus reactor may be proposed
8	400 kV Jammalamadugu SS	1x8MVAr Approved	Expedited
9	400kV KV Kota SS	No reactor available	1x125 MVAr bus reactor may be proposed
10	400kV Gooty SS	1x125MVAr+ 1x63MVAr in service	
11	400kV Nunna SS	2X63 +2X125 MVAr in-service	
12	400kV Sattenapally	1x125 MVAr Approved	May be Expedited
13	400kV Kurnool SS(AP)	1x125 MVAr +1x63 MVAr in service	

S.No.	Sub-Station	Reactors Approved/Commissioned	Remarks
14	400kV Ghani SS	1x125 MVAR in service	2nd 125 MVAR may be Expedited
15	400kV Urvakonda SS	1x80 MVAR approved, 1x125MVAR in service	May be Expedited
16	400 kV Malkaram SS	1x125MVAR in service	
17	400kV Veltloor	1x125MVAR in service	
18	400kV Mamidipally SS	1x125MVAR inservice	
19	400kV Hyderabad SS	1x63 MVAR in service	
20	400kV Srisailam LB SS	1x125 MVAR in service	May be Expedited
21	400 kV Kaiga SS	2x125 MVAR Approved	May be Expedited
22	400kV Hassan SS	1x125 MVAR + 1x80 MVAR in service	
23	400kV Talaguppa SS	1x125 MVAR Approved	May be Expedited
24	400kV Karaikudi SS	1x80 MVAR in service	One more reactor may be proposed
25	400kV Thiruvallam SS	1x63 MVAR in service	
26	400 kV Udumalpet SS	No reactor available	
27	400kV Pavagada SS	2x125 MVAR Approved	May be Expedited
28	400kV UPCL SS	2x125 MVAR Approved	May be Expedited
29	400kV Davanagere SS	1x125 MVAR Approved	May be Expedited
30	400kV Asupaka SS	1x80 MVAR Approved	May be Expedited
31	400kV Kamuthi SS	2x80 MVAR Approved	May be Expedited

S.No.	Sub-Station	Reactors Approved/Commissioned	Remarks
32	400kV Kayathar	1x125 MVAR Approved	May be Expedited
33	400kV Yelhanka	2x63 MVAR in 40 th Standing Committee. Considering the uncertainty in commissioning of Yelahanka 400/220kV S/s, due to severe RoW issues POWERGRID had deferred the procurement of 2x63 MVAR, 420 kV bus reactors	400kV Yelahanka SS going to commission soon. Reactor commissioning may be considered

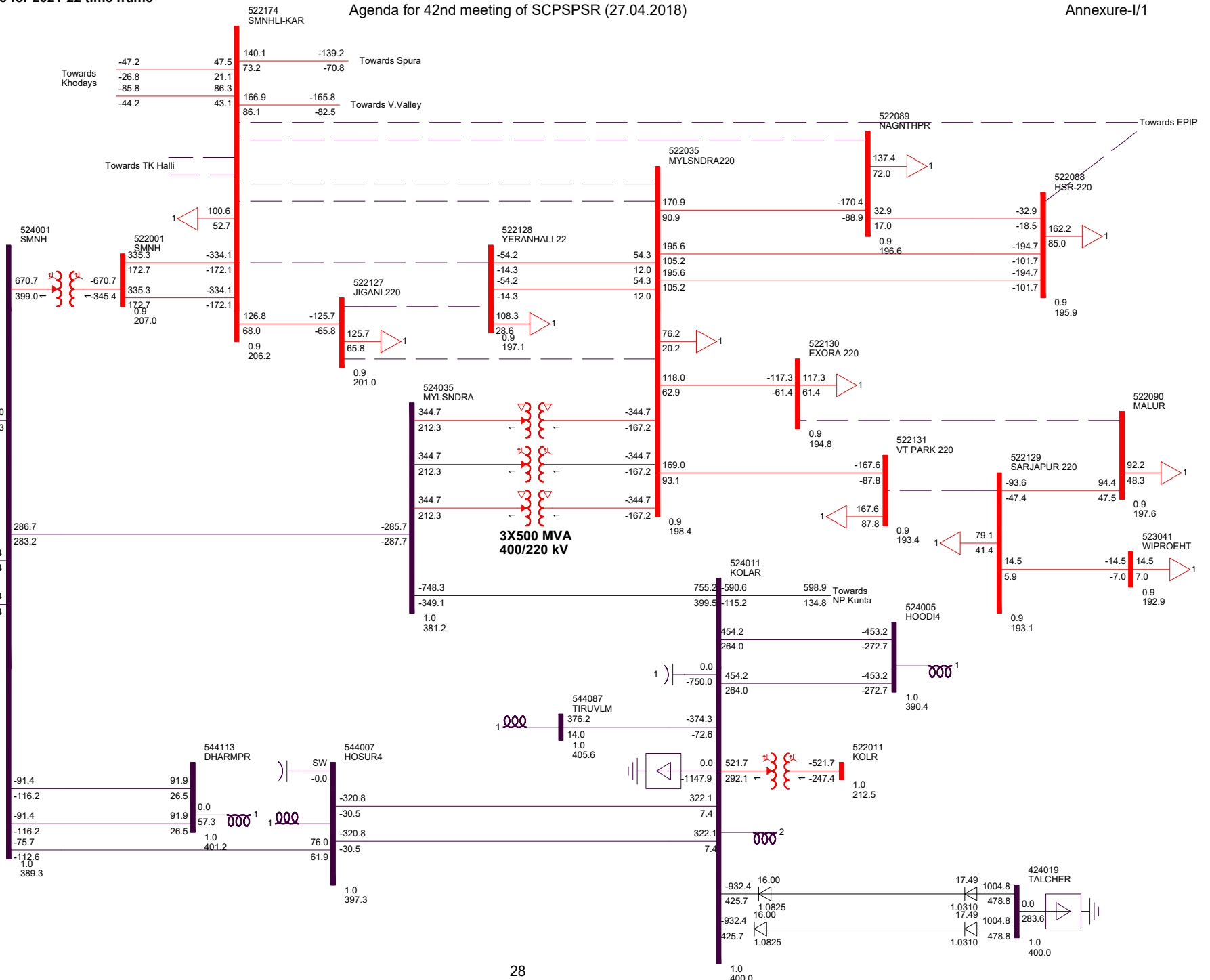
- b. Need to expedite the commissioning of Bus reactors approved and also required to plan more reactive compensation.

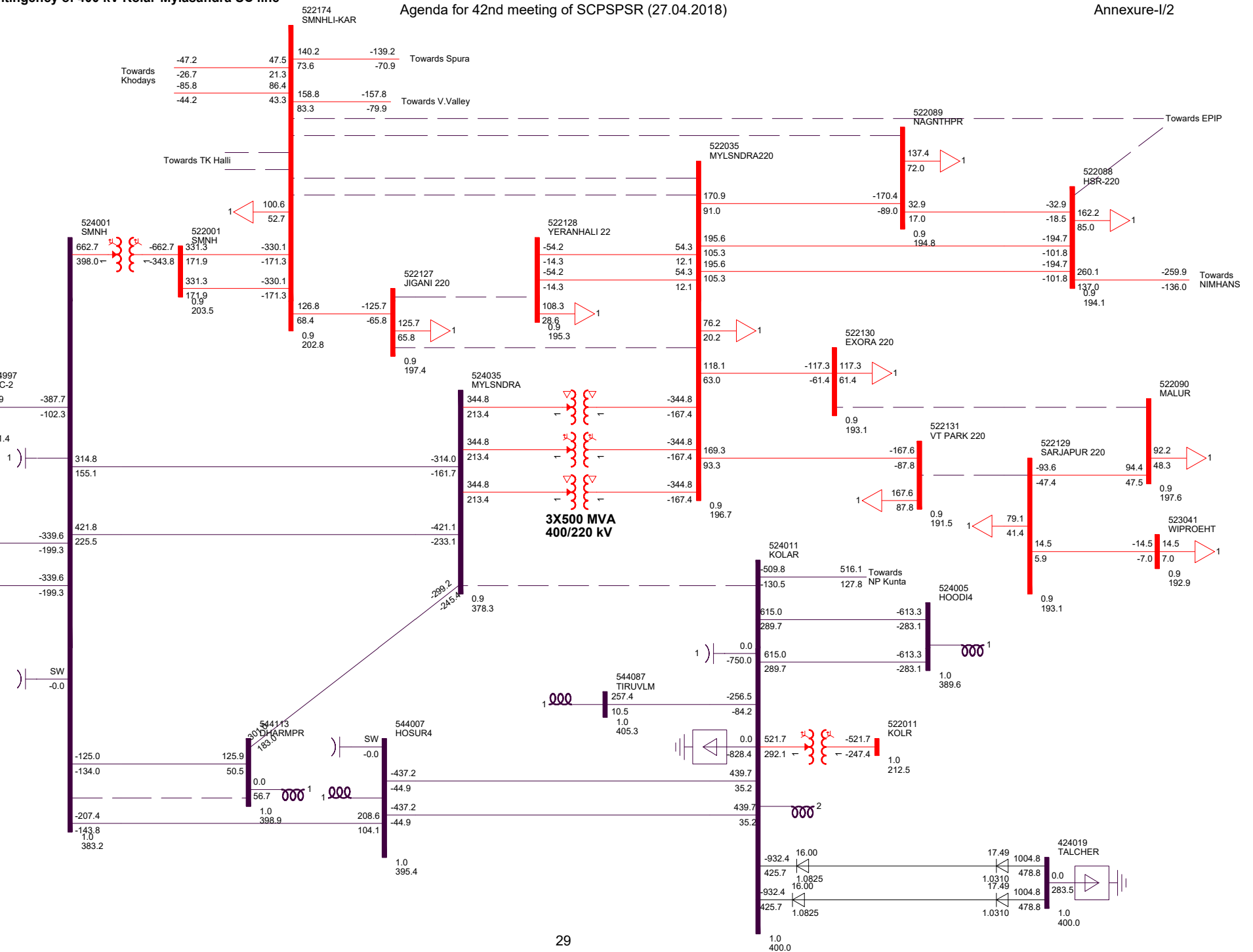
30.0 Overloading of Nelamangala-Mysore D/c line:

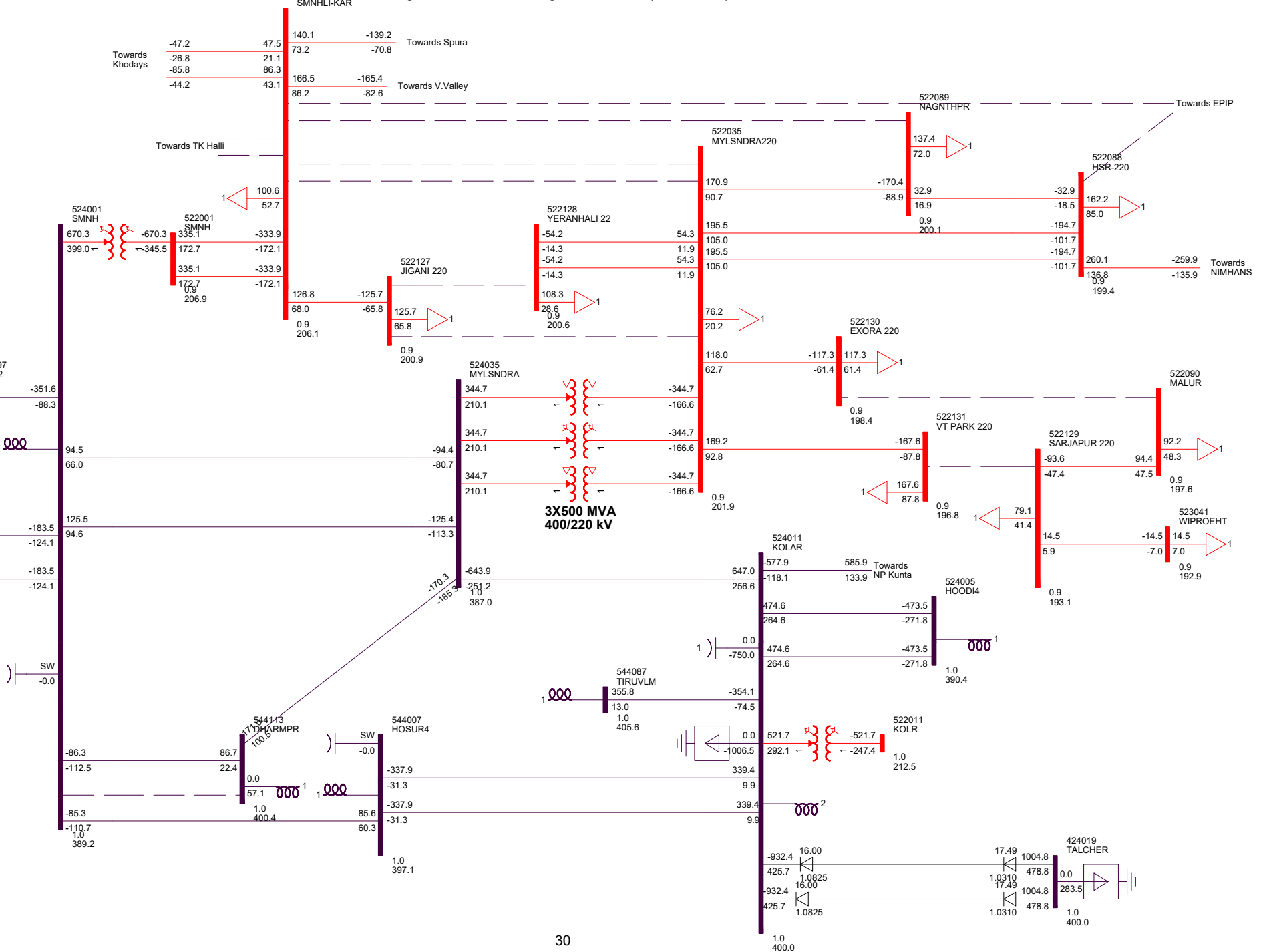
- 30.1 With the increased drawls at 400kV Kozhikode SS & 400kV Mysore SS and less generation in UPCL area, 400kV Nelamangala-Mysore DC line getting heavily loaded. This high loading would reduce the import capability of Kerala also. To relieve the congestion, the planned 400kV Hiriyur-Mysore D/c line and Lines under construction in Kerala regions to be expedited.

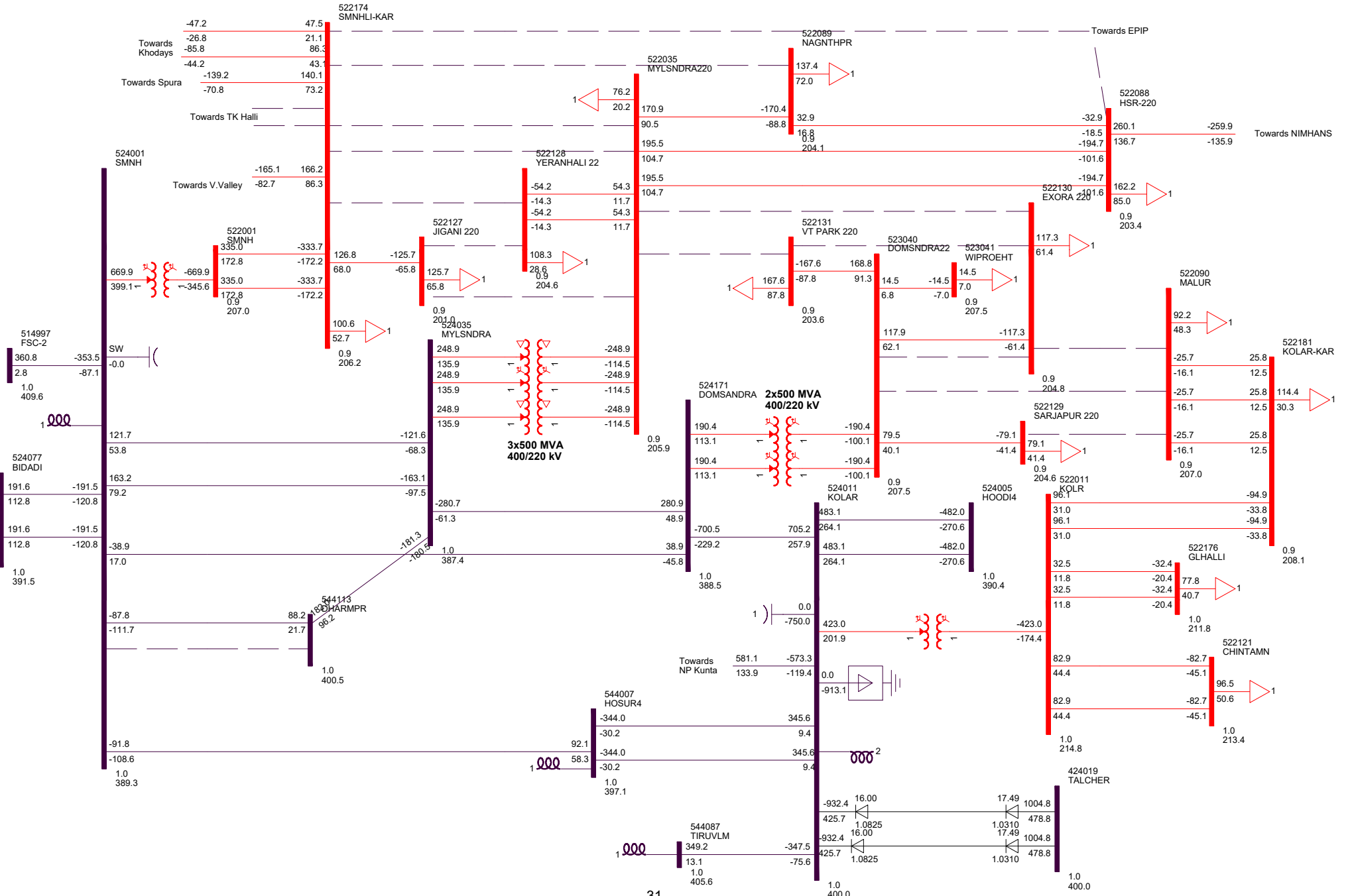
31.0 ATS of Yeramarus TPS:

- 31.1 Due to non-commissioning of Yeramarus TPS associated transmission system, 400 kV Hiriyur-Nelamangala DC line is getting heavily loaded during high wind generation in Karnataka. Need to expedite the Yeramarus TPS associated transmission system

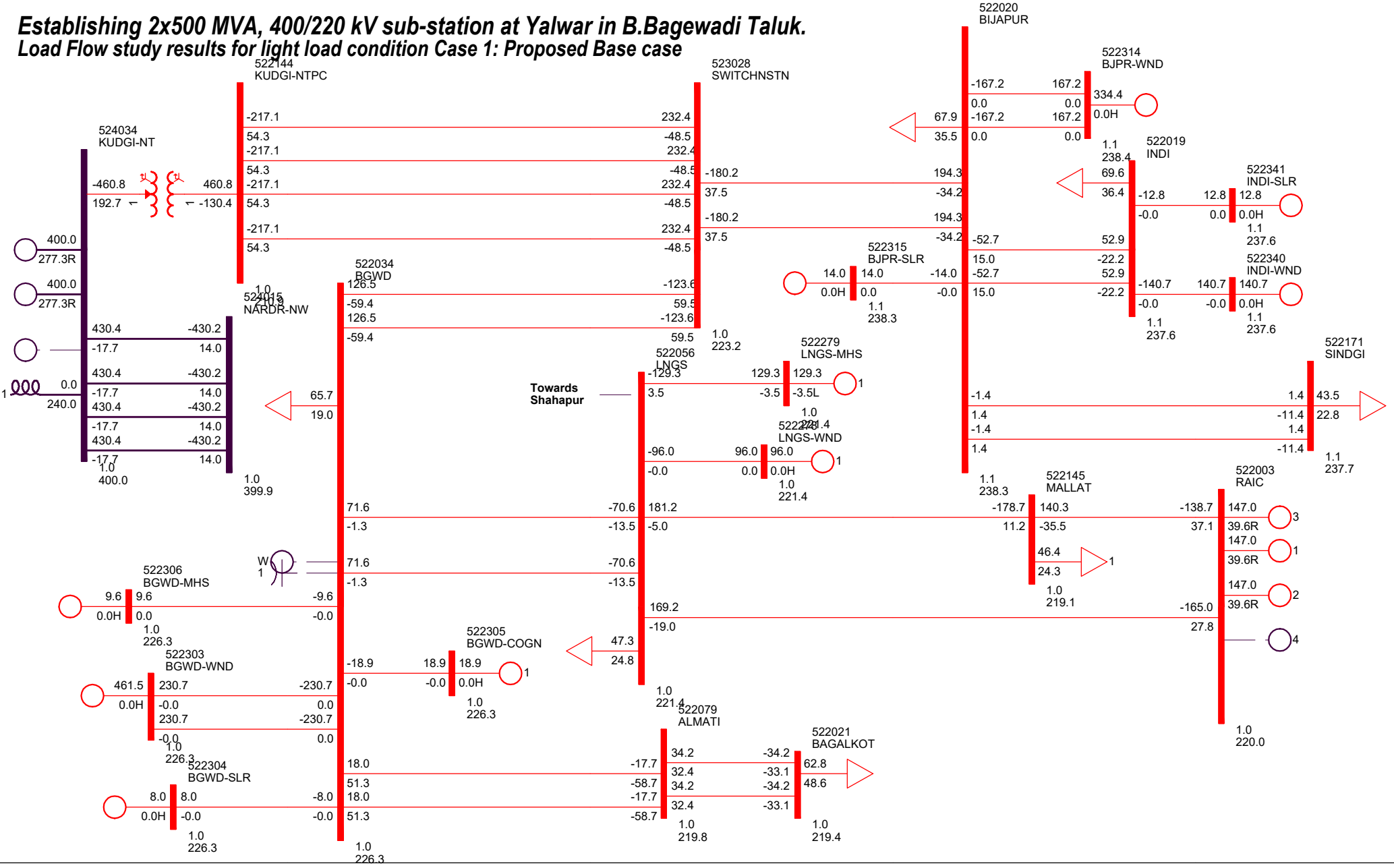






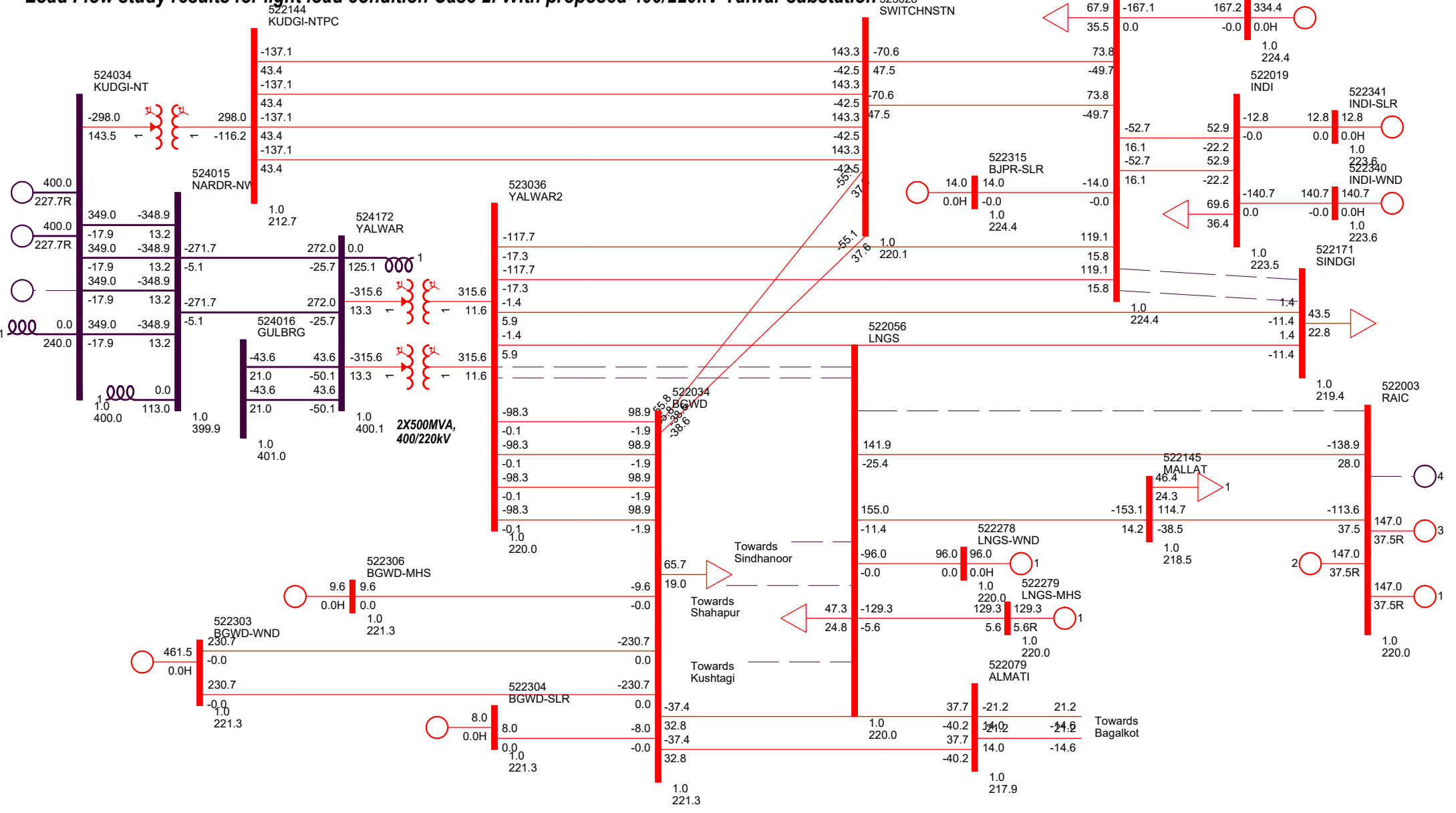


Establishing 2x500 MVA, 400/220 kV sub-station at Yalwar in B.Bagewadi Taluk.
Load Flow study results for light load condition Case 1: Proposed Base case



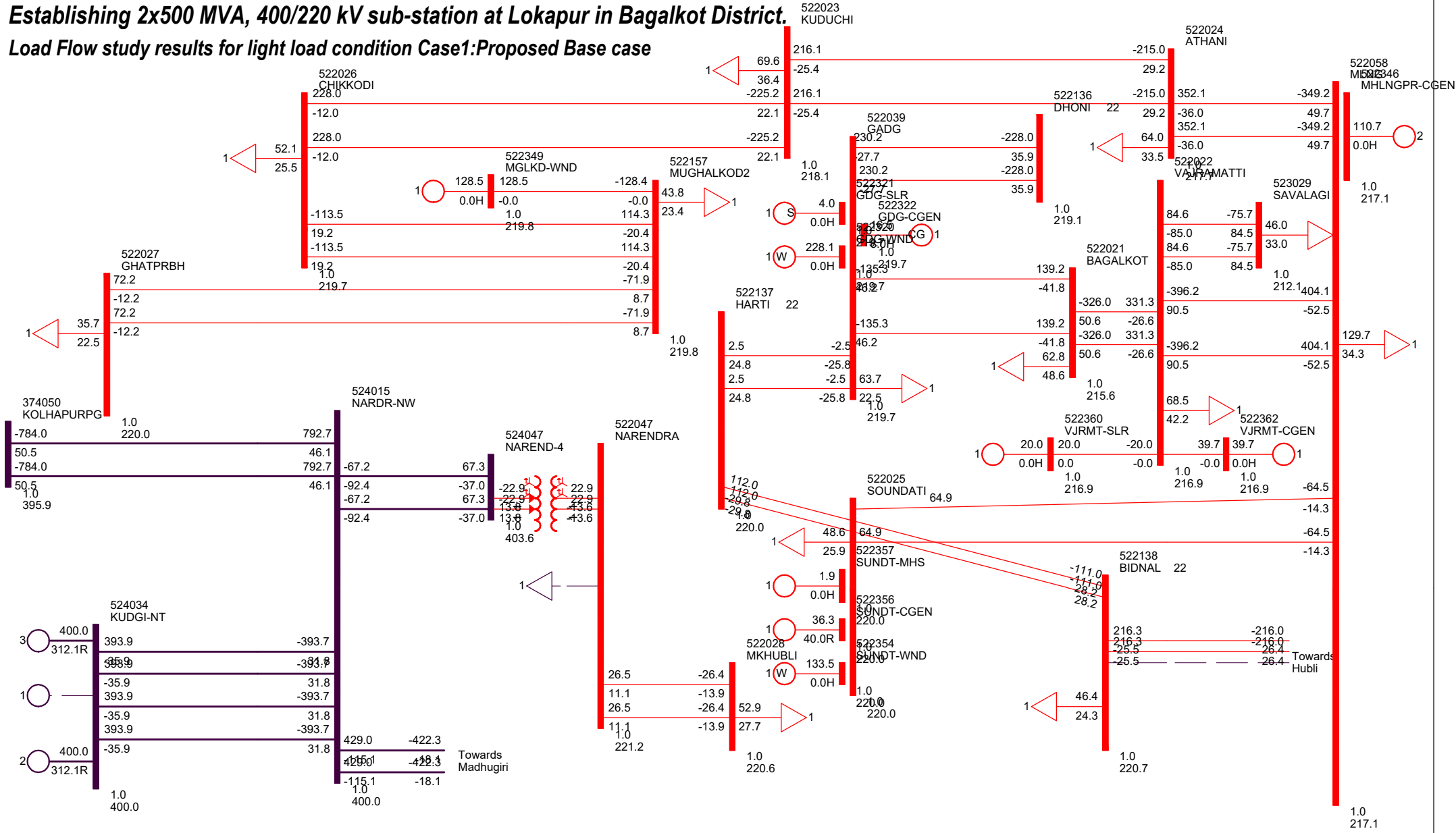
Establishing 2x500 MVA, 400/220 kV sub-station at Yalwar in B.Bagewadi Taluk.

Load Flow study results for light load condition Case 2: With proposed 400/220kV Yalwar substation



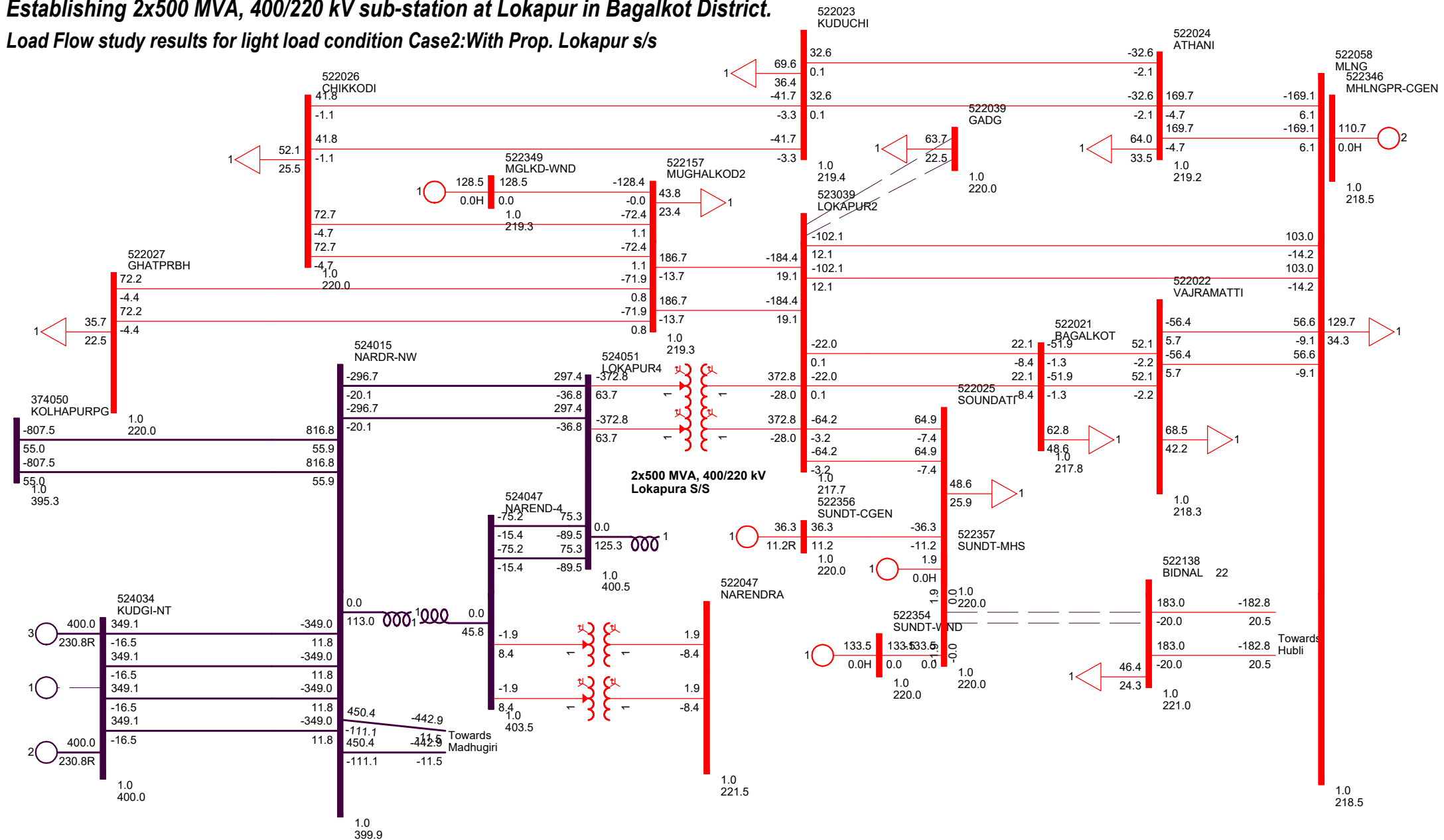
Establishing 2x500 MVA, 400/220 kV sub-station at Lokapur in Bagalkot District.

Load Flow study results for light load condition Case1:Proposed Base case



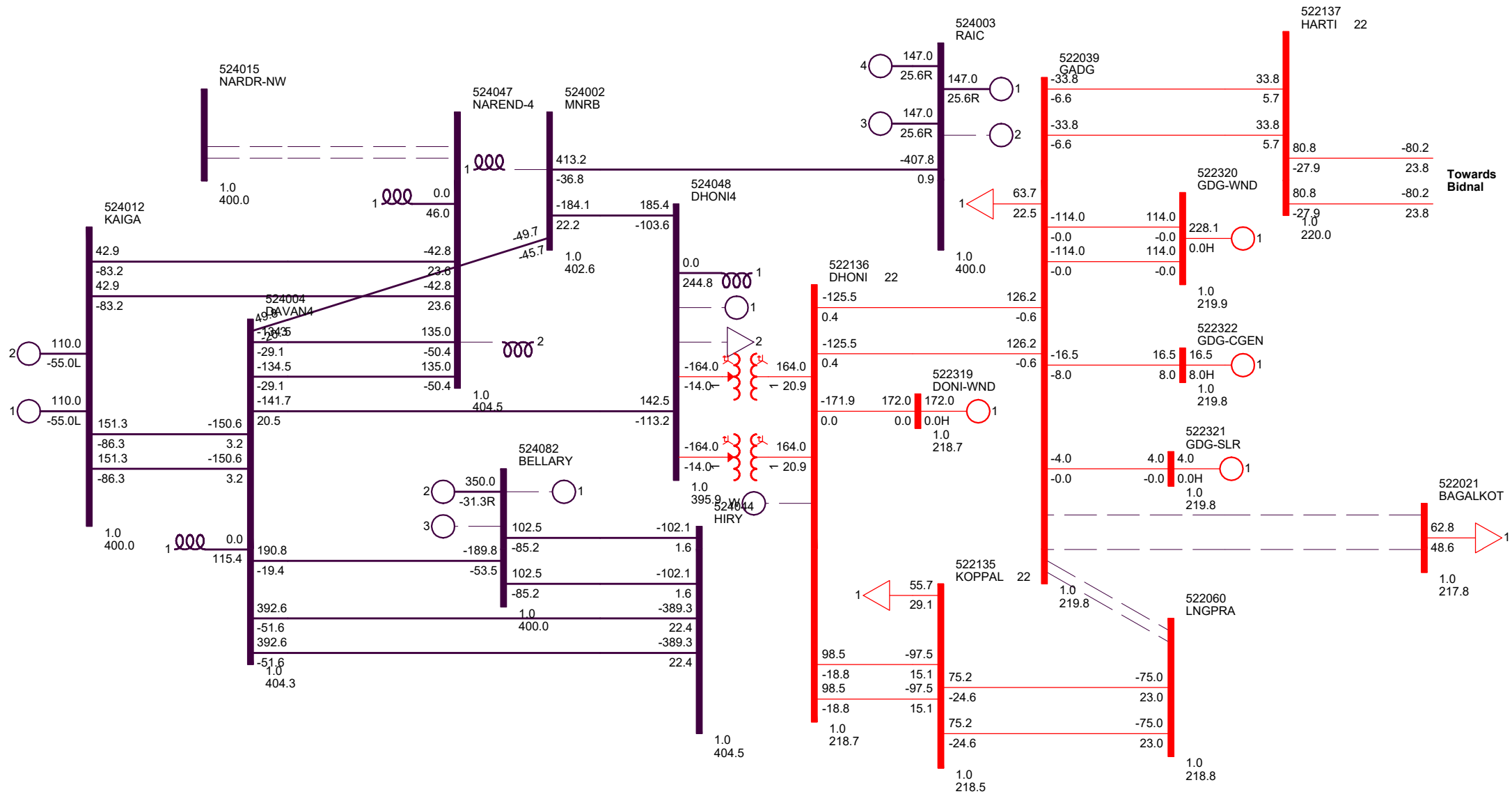
Establishing 2x500 MVA, 400/220 kV sub-station at Lokapur in Bagalkot District.

Load Flow study results for light load condition Case2:With Prop. Lokapur s/s



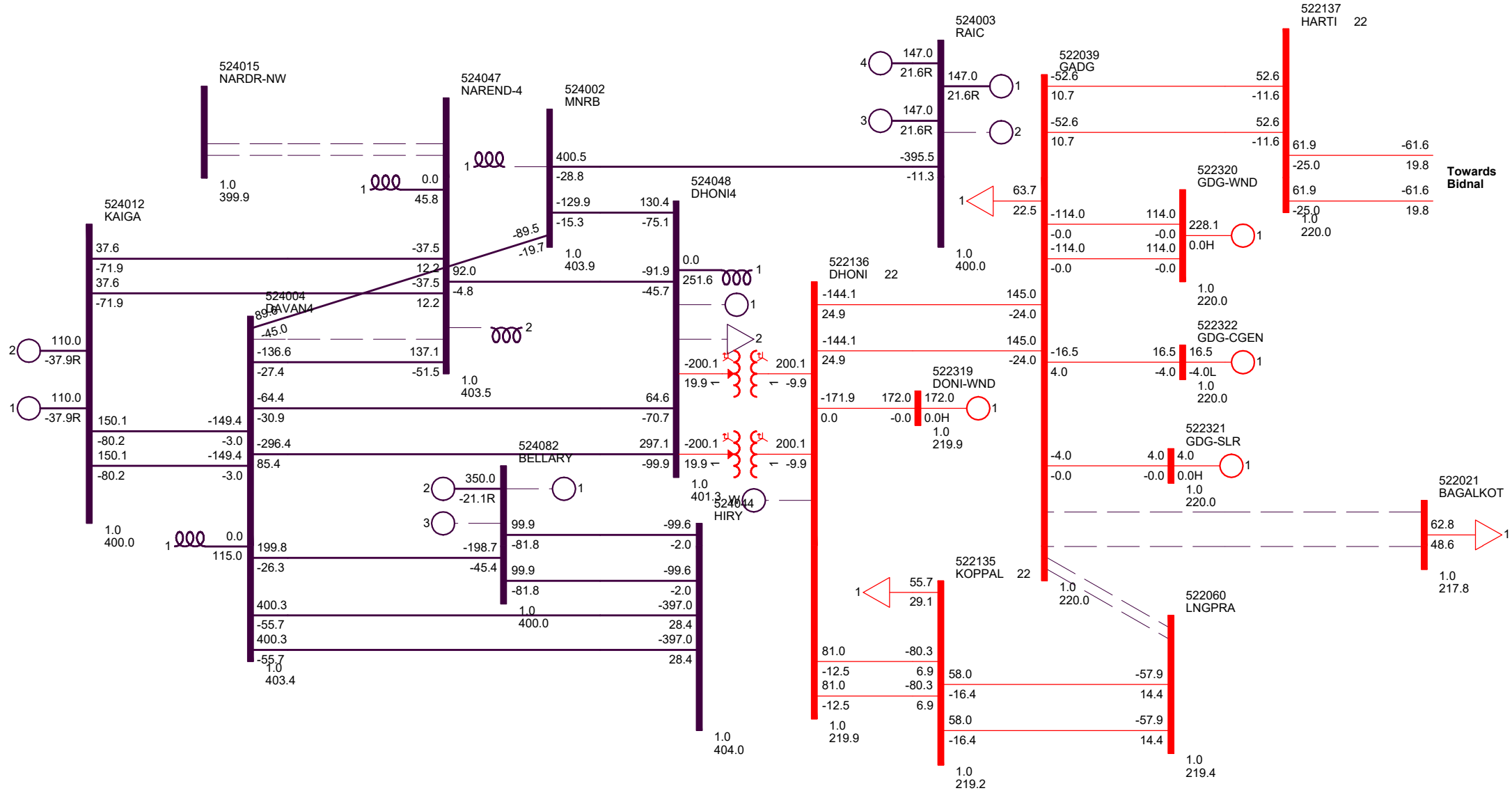
Additional incoming 400kV line to Doni by LILO arrangement of 400 kV Narendra-Guttur DC line.

Load Flow study results for light load condition Case 1:Proposed Basecase



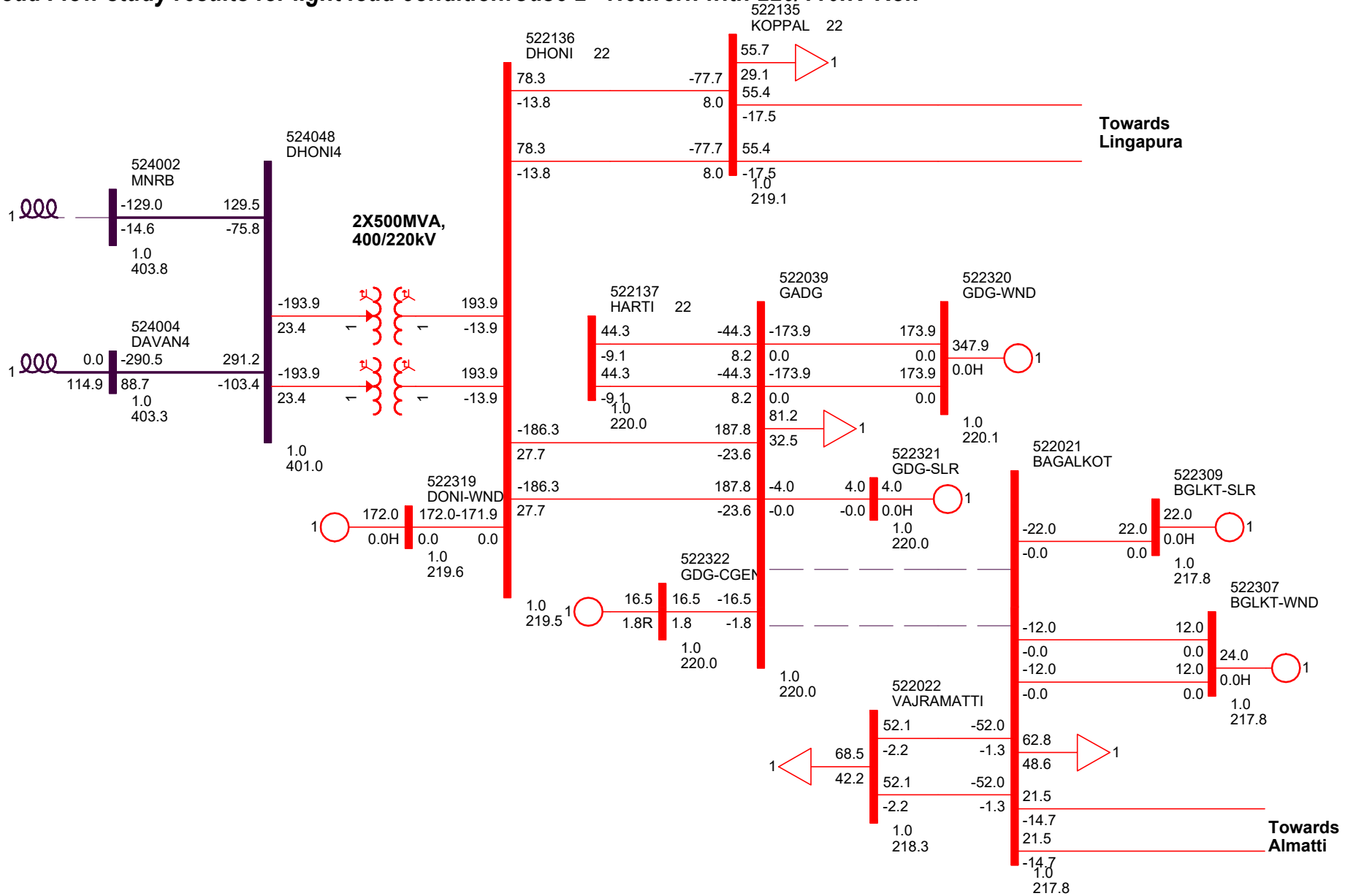
Additional incoming 400kV line to Doni by LILO arrangement of 400 kV Narendra-Guttur DC line.

Load Flow study results for light load condition Case 2:with proposed SC LIL0 of 400kV Narendra-Guttur DC line to 400/220kV Doni substation



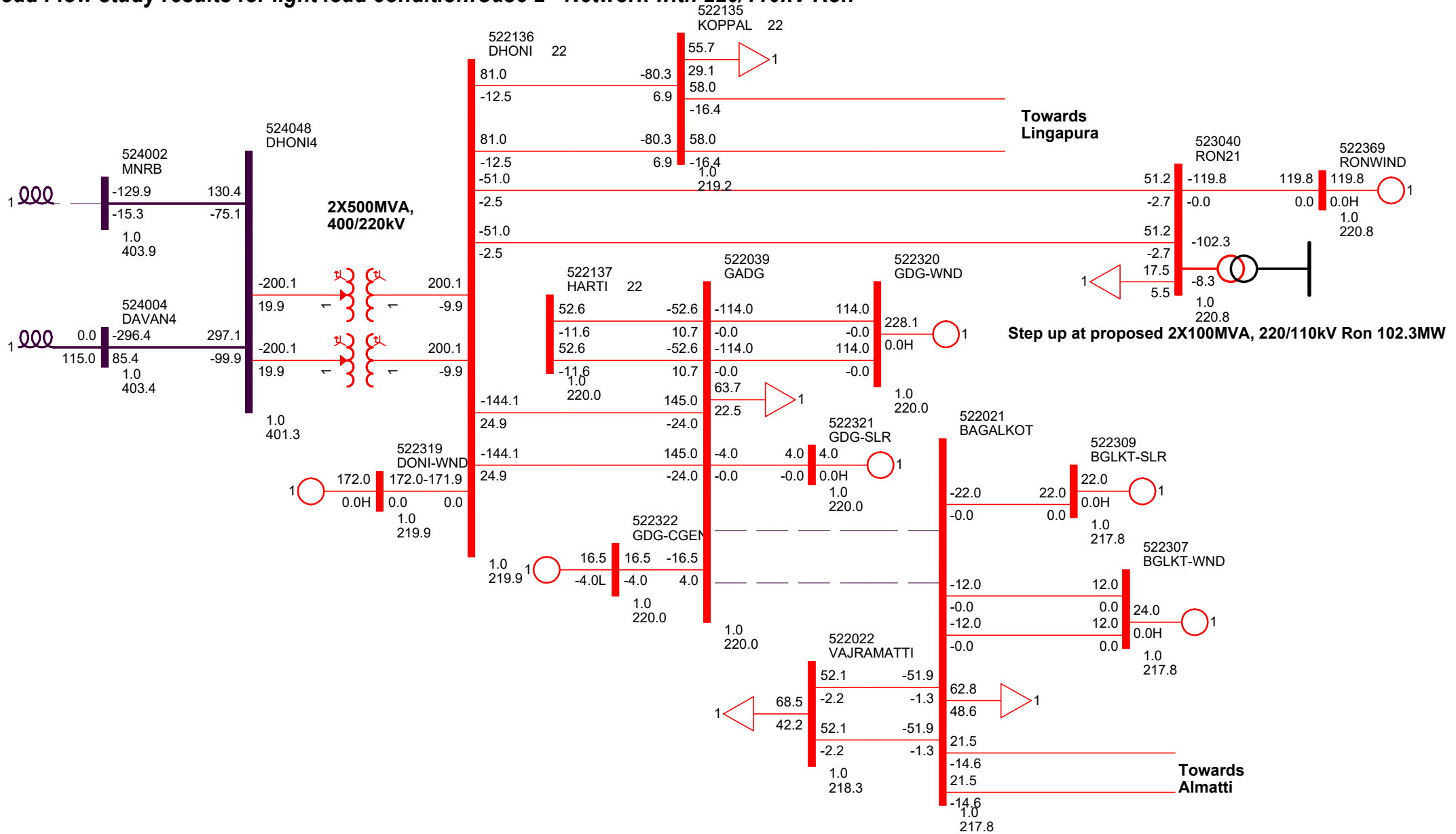
Establishing 2 X 100 MVA, 220/110kV sub-station at Ron in Gadag district

Load Flow study results for light load condition: Case 2 - Network with 220/110kV Ron



Establishing 2 X 100 MVA, 220/110kV sub-station at Ron in Gadag district

Load Flow study results for light load condition: Case 2 - Network with 220/110kV Ron

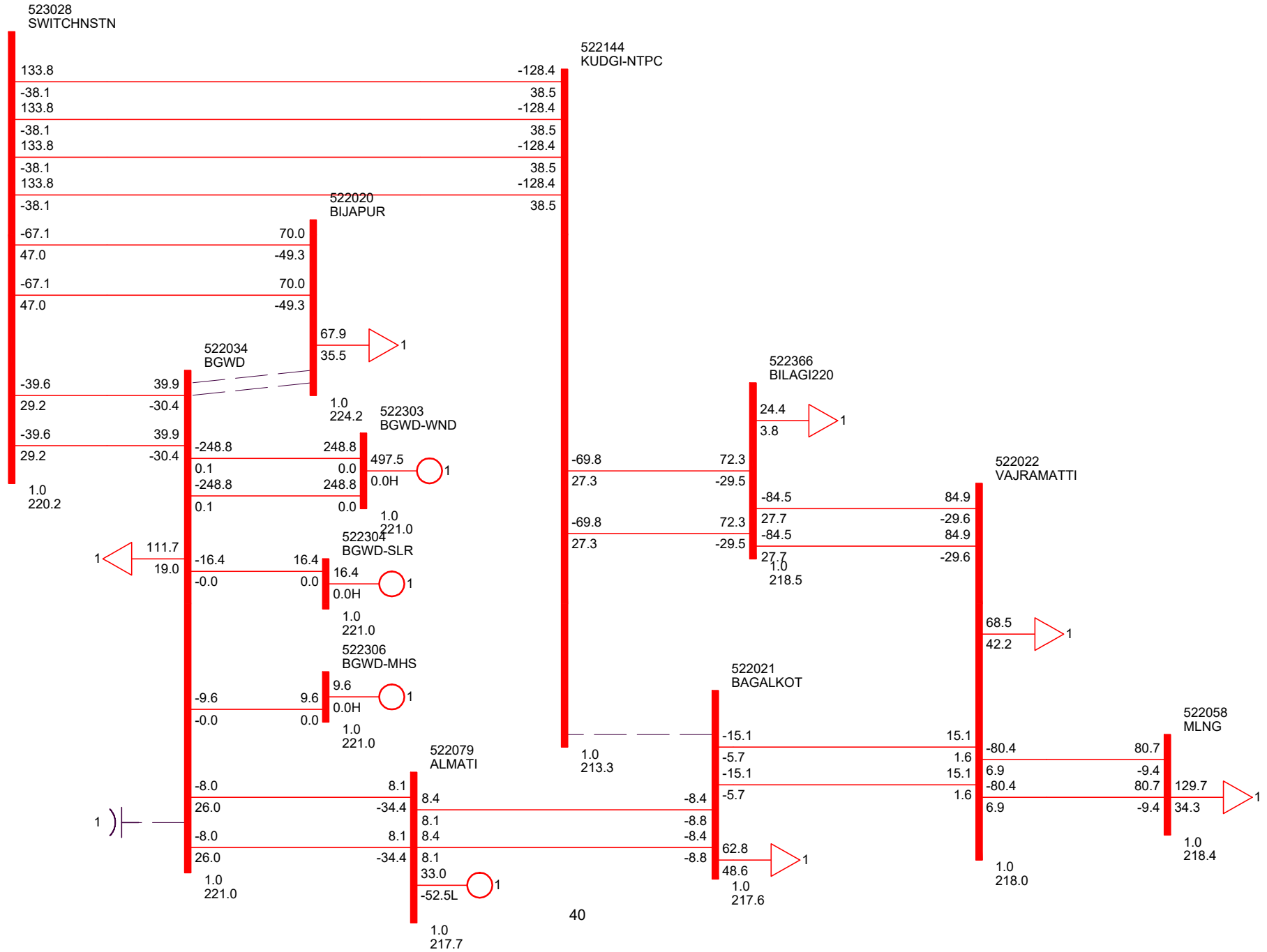


Establishing 2 X 100 MVA, 220/110kV sub-station at Savalgi in Gadag district

Agenda for 2nd Meeting of SCPPCB (27/04/2018)

Annexure-II/9

Load Flow study results for light load condition: Case 1 - Network without 220/110kV Savalgi

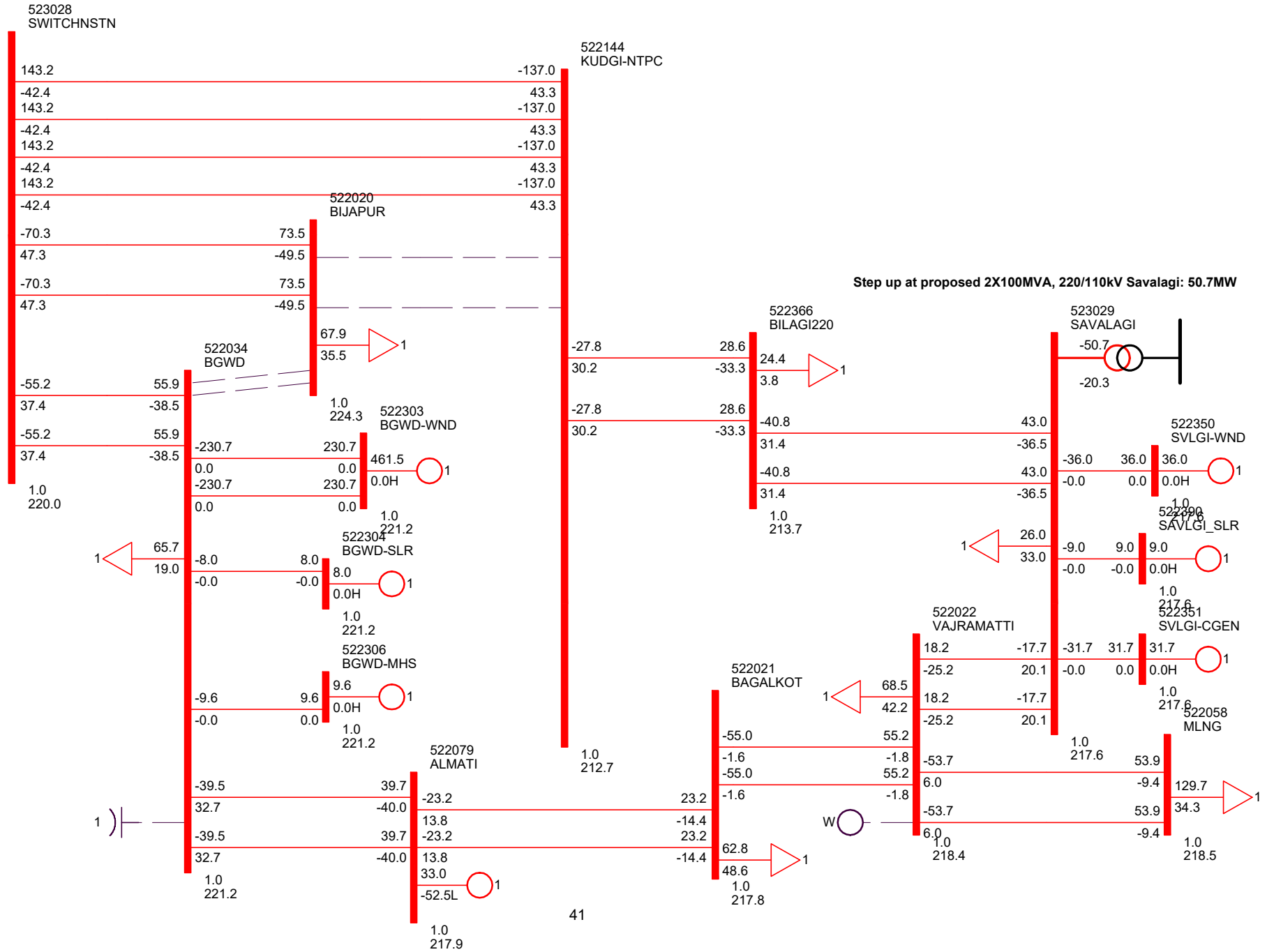


Establishing 2 X 100 MVA, 220/110kV sub-station at Savalgi in Gadag district

Agenda for 2nd Meeting of SPP/SPSR (27.04.2018)

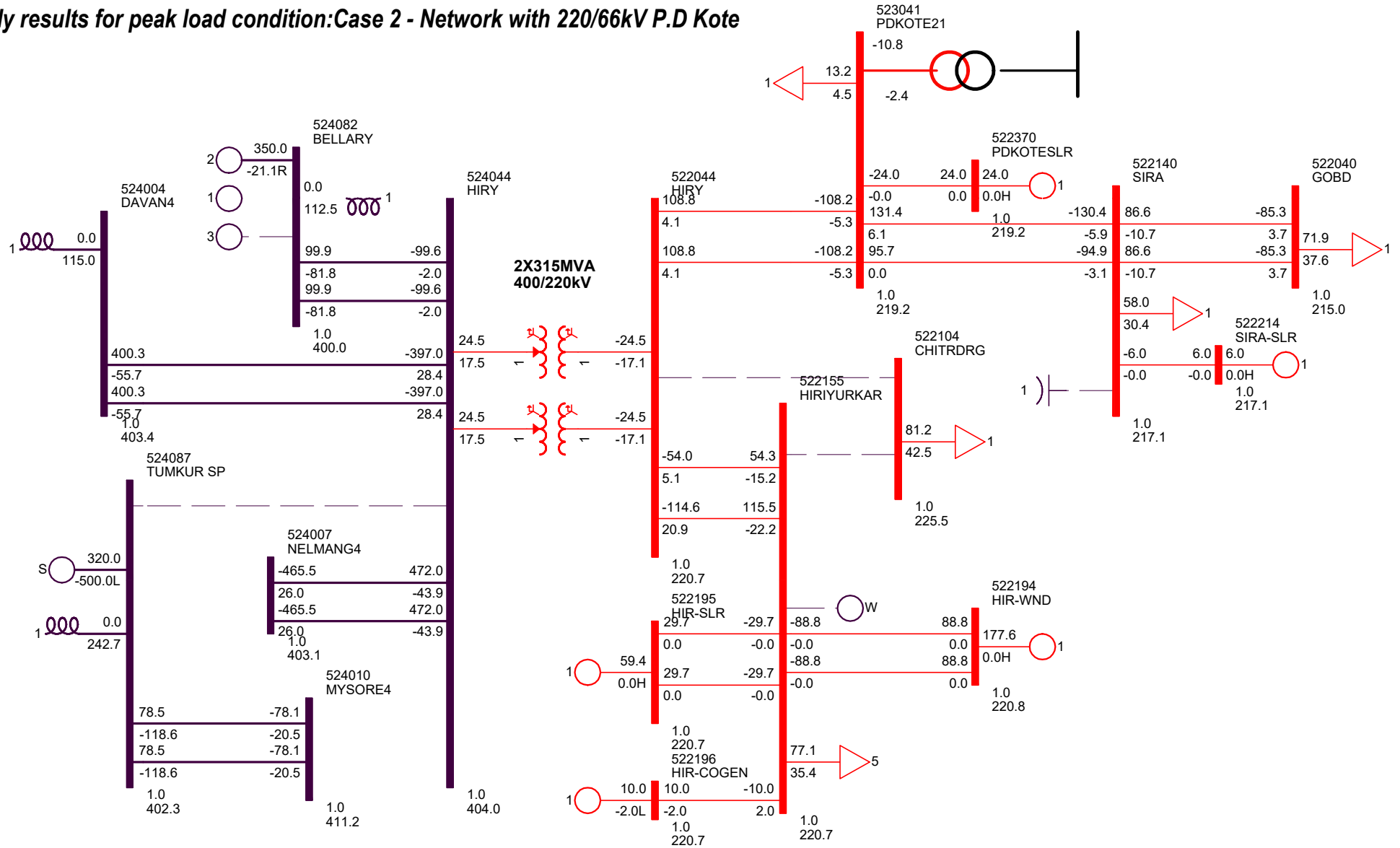
Annexure-II/10

Load Flow study results for light load condition: Case 2 - Network with 220/110kV Savalgi



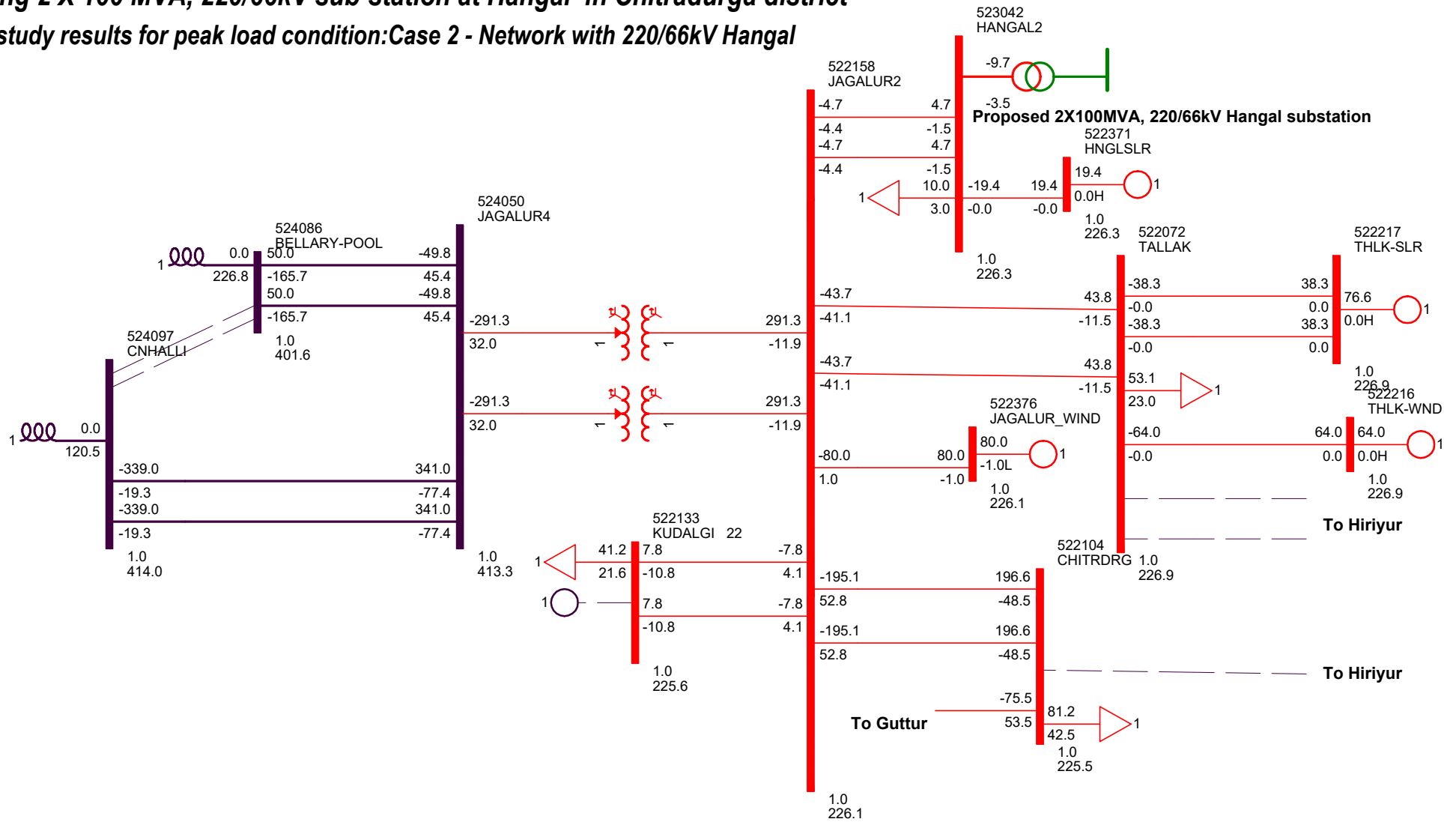
Establishing 2 X 100 MVA, 220/66kV sub-station at P.D Kote in Chitradurga district

Load Flow study results for peak load condition: Case 2 - Network with 220/66kV P.D Kote



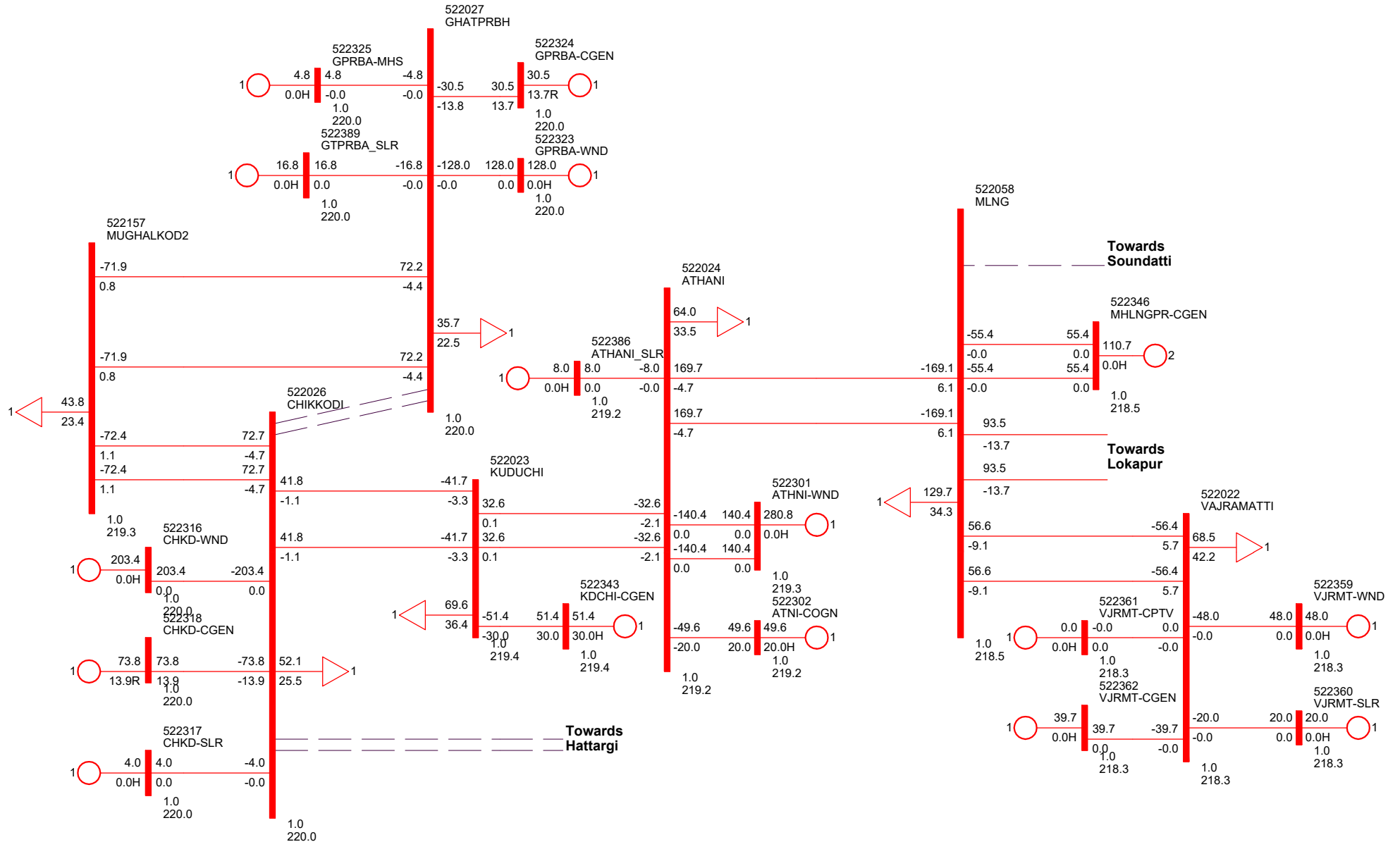
Establishing 2 X 100 MVA, 220/66kV sub-station at Hangal in Chitradurga district

Load Flow study results for peak load condition: Case 2 - Network with 220/66kV Hangal



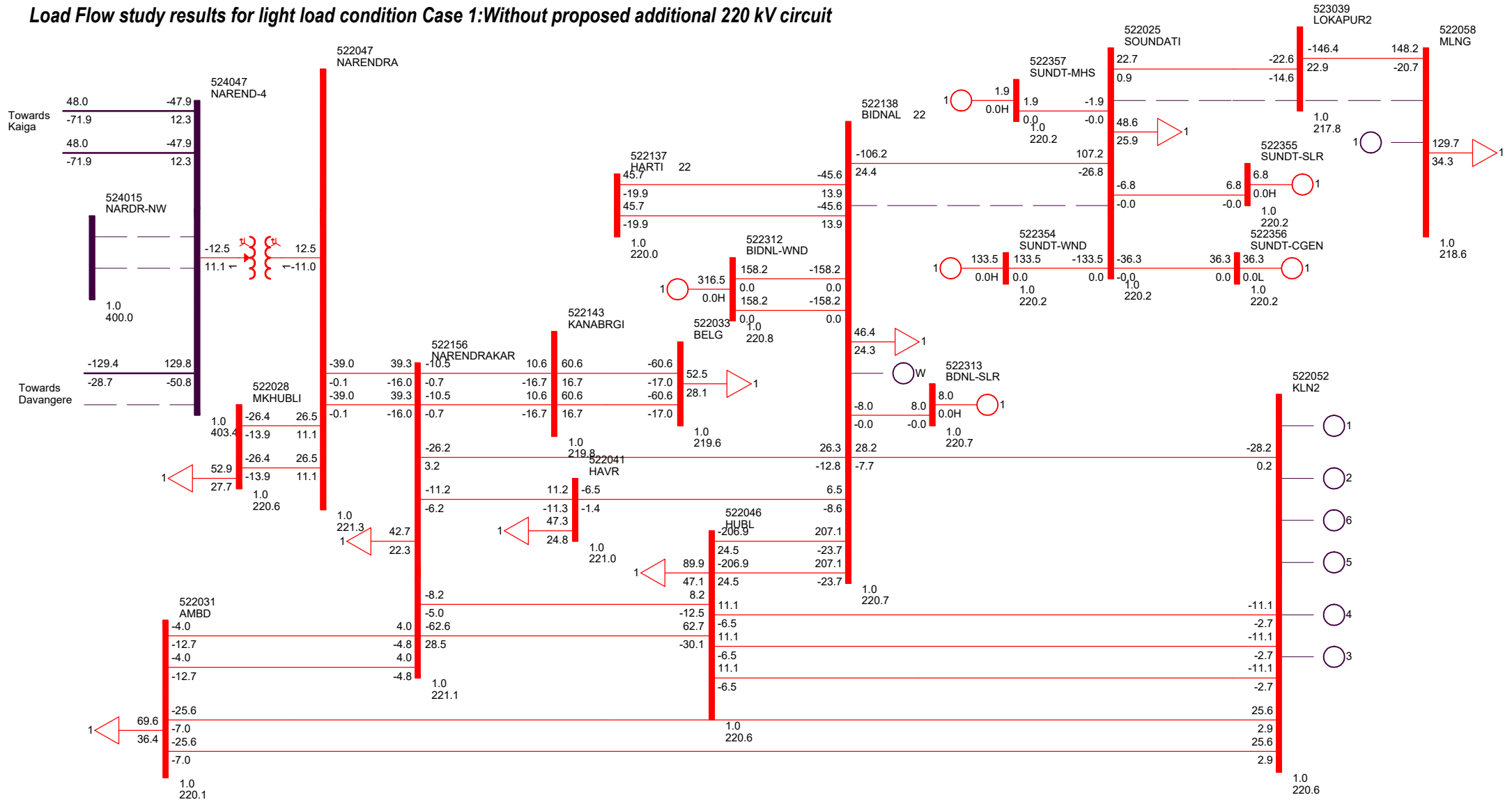
LILO of 2nd circuit of the existing 220 kV DC line running between 220 kV stations at Mahalingpura and Kudachi to 220 kV sub-station at Athani.

Load Flow study results for light load condition: Case 2 - Network with proposed conversion



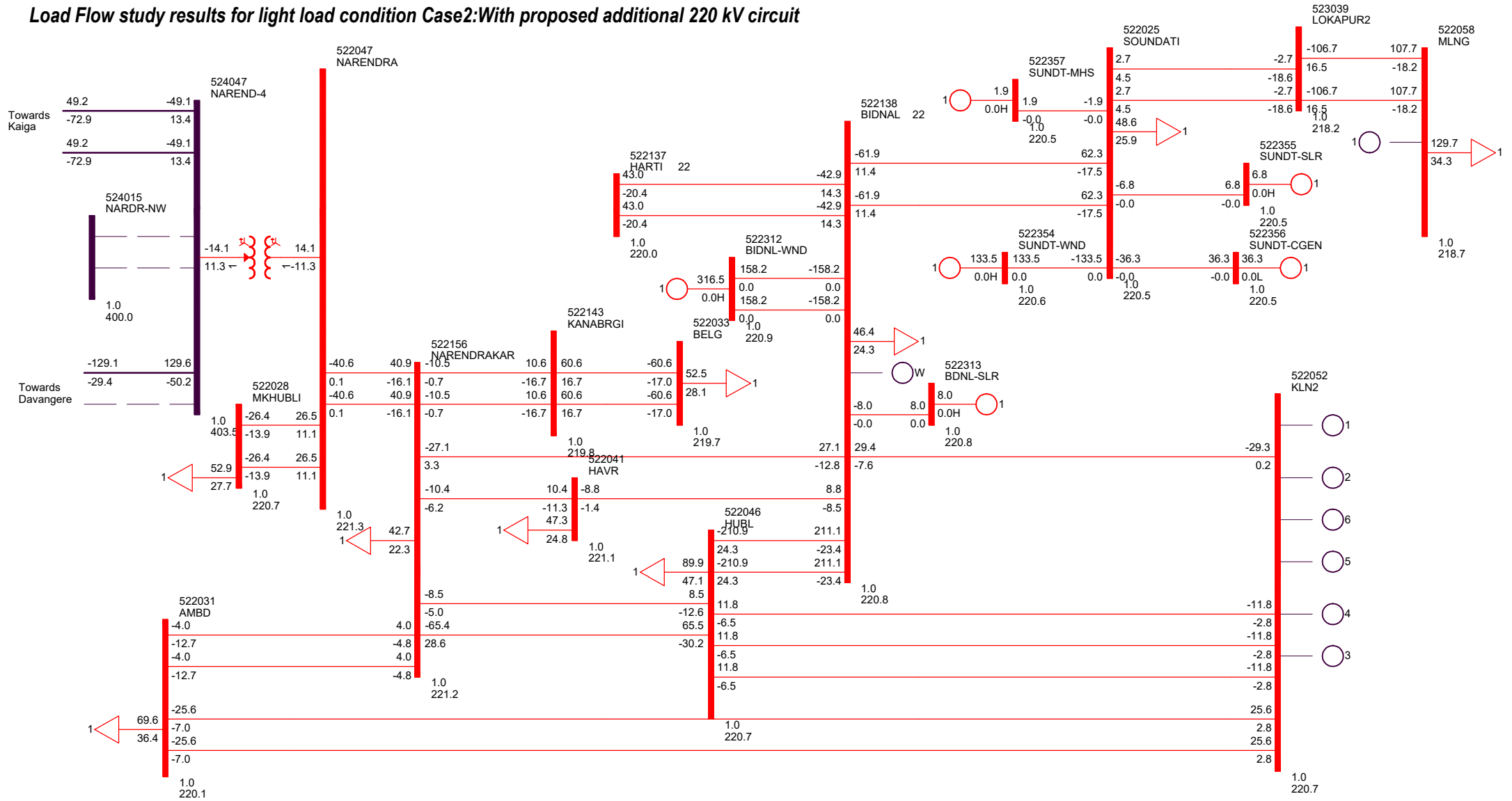
Conversion of existing 220 kV SC line to 220 kV DC line running between 220 kV stations at Bidnal, Saundatti and Mahalingpura.

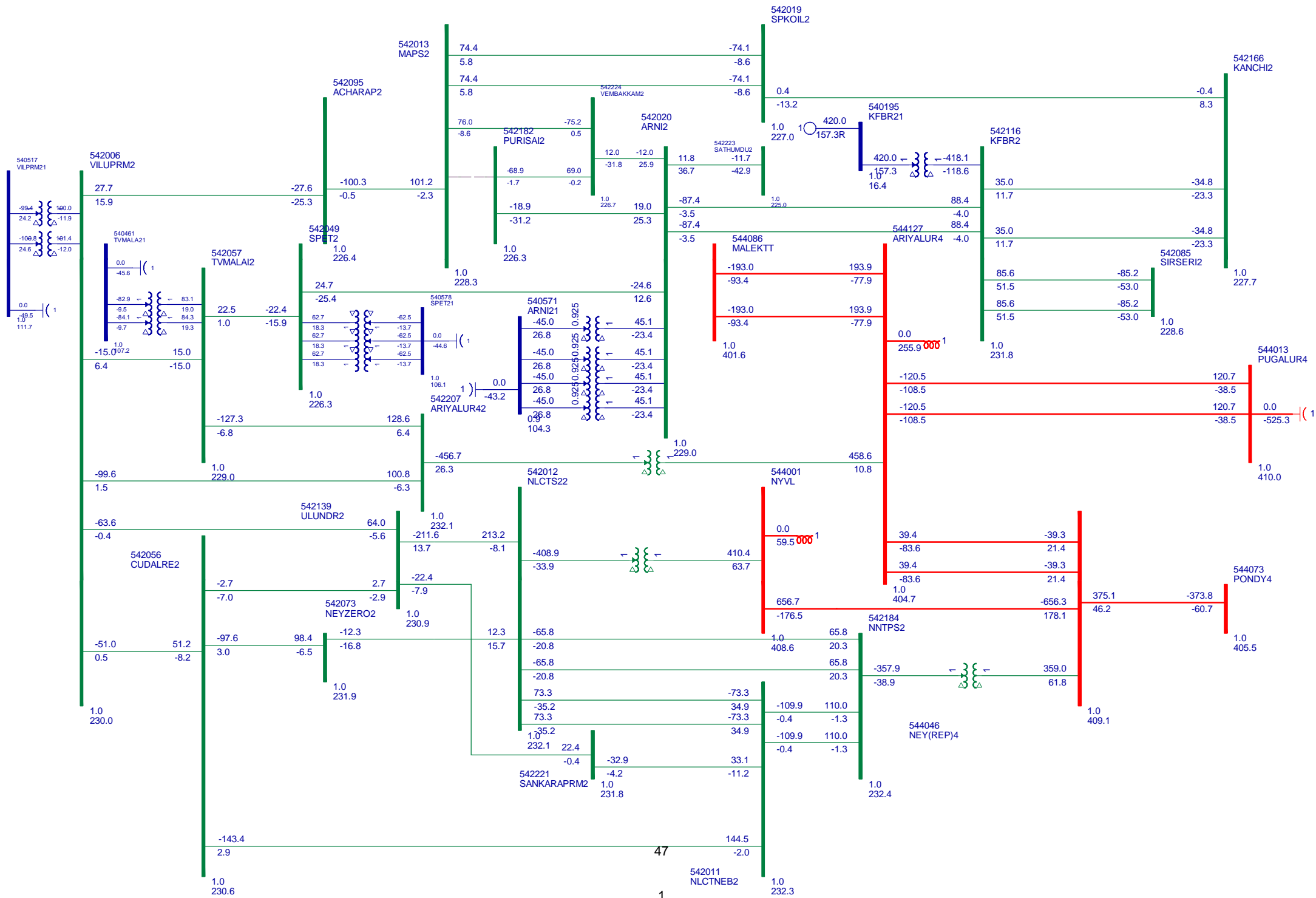
Load Flow study results for light load condition Case 1: Without proposed additional 220 kV circuit

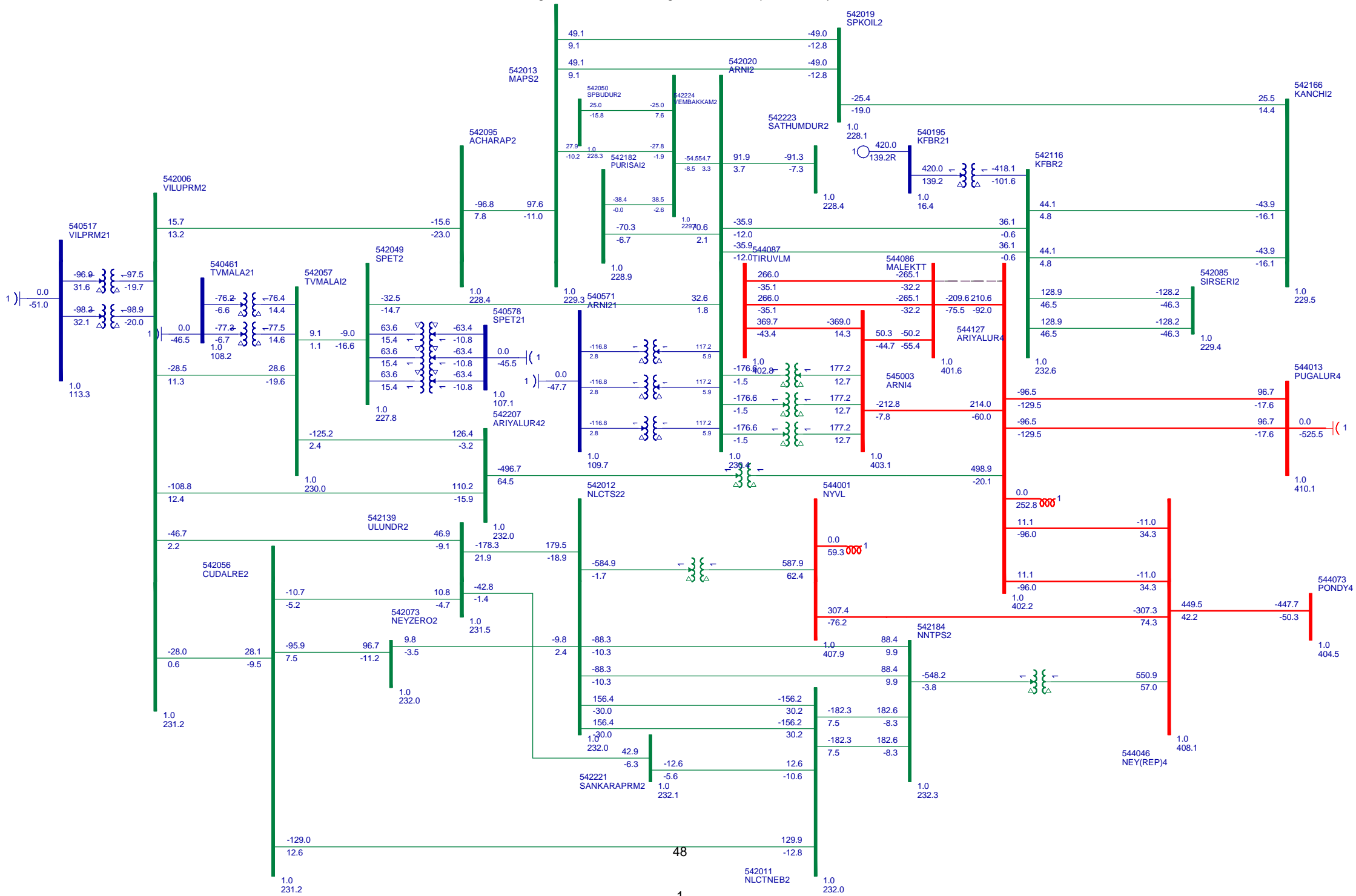


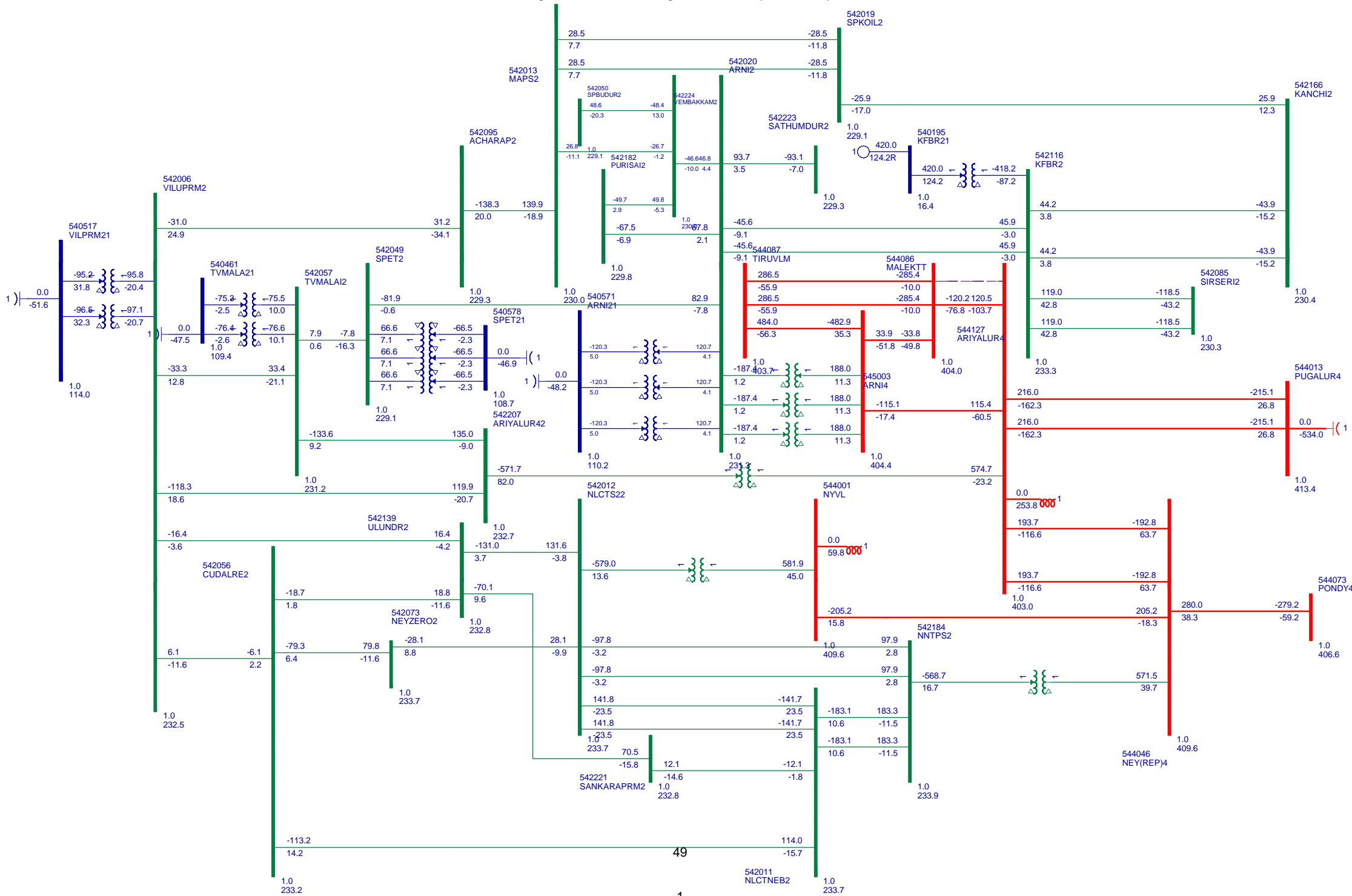
Conversion of existing 220 kV SC line to 220 kV DC line running between 220 kV stations at Bidnal, Saundatti and Mahalingpura.

Load Flow study results for light load condition Case2:With proposed additional 220 kV circuit

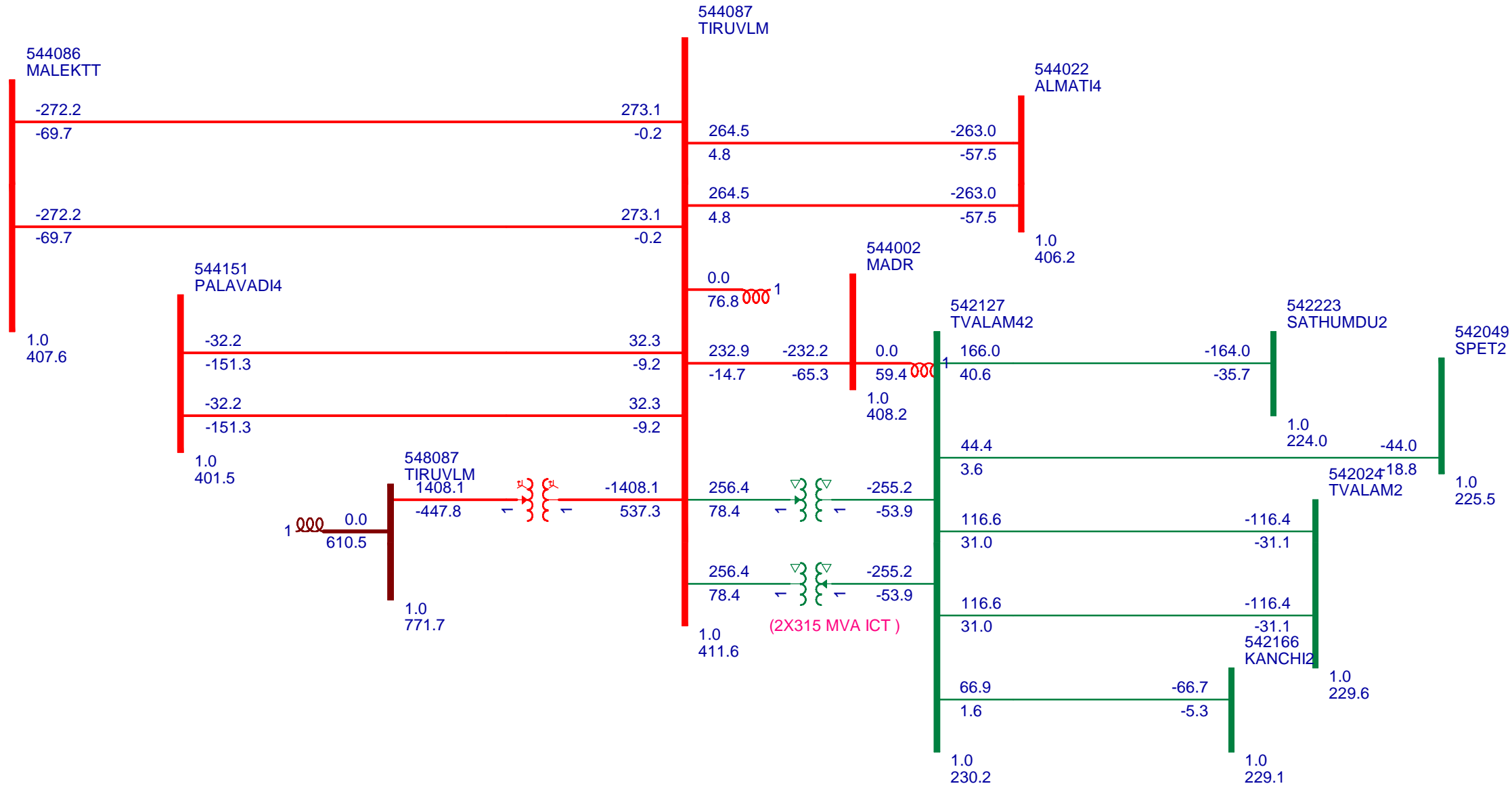




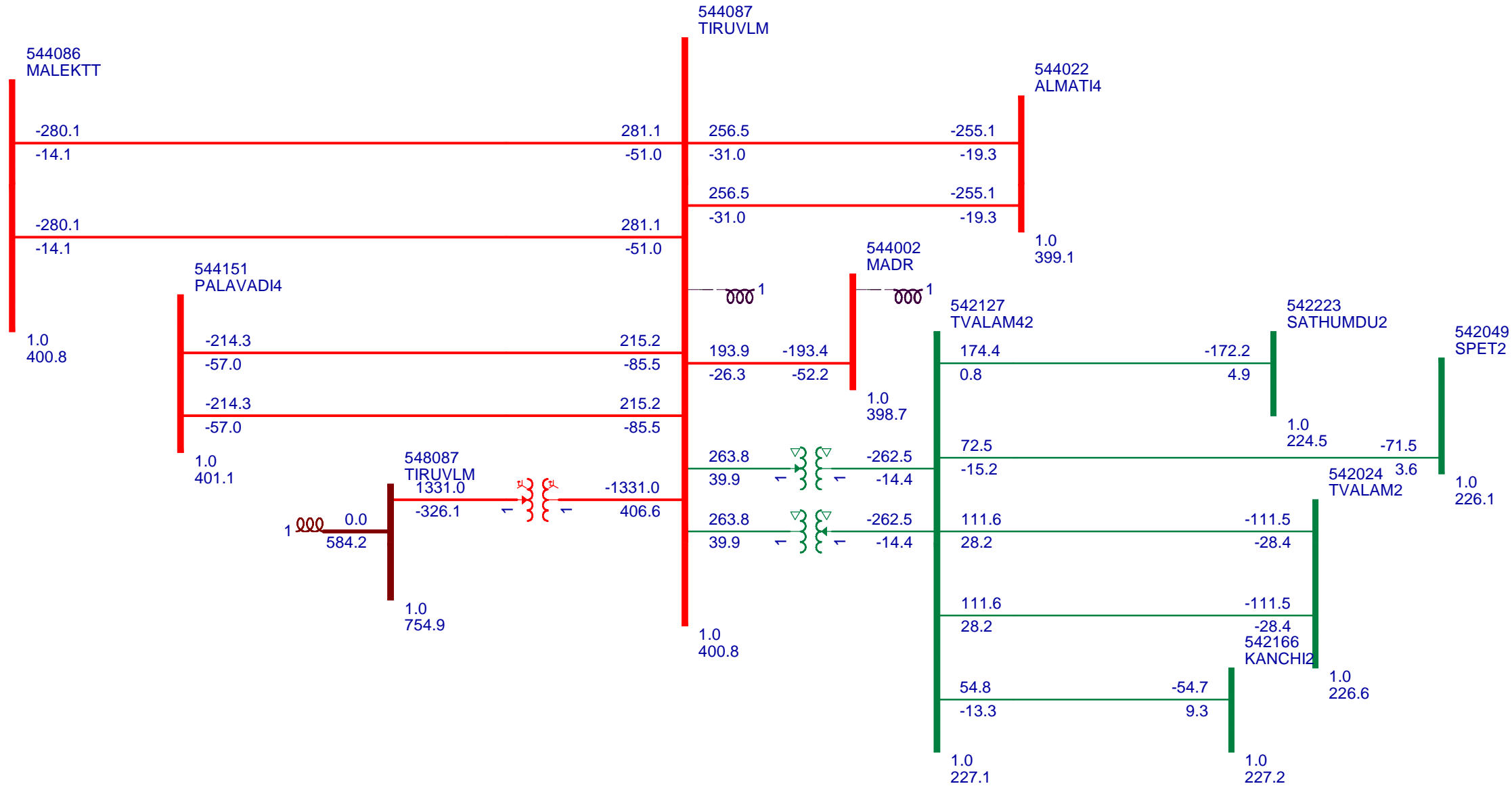




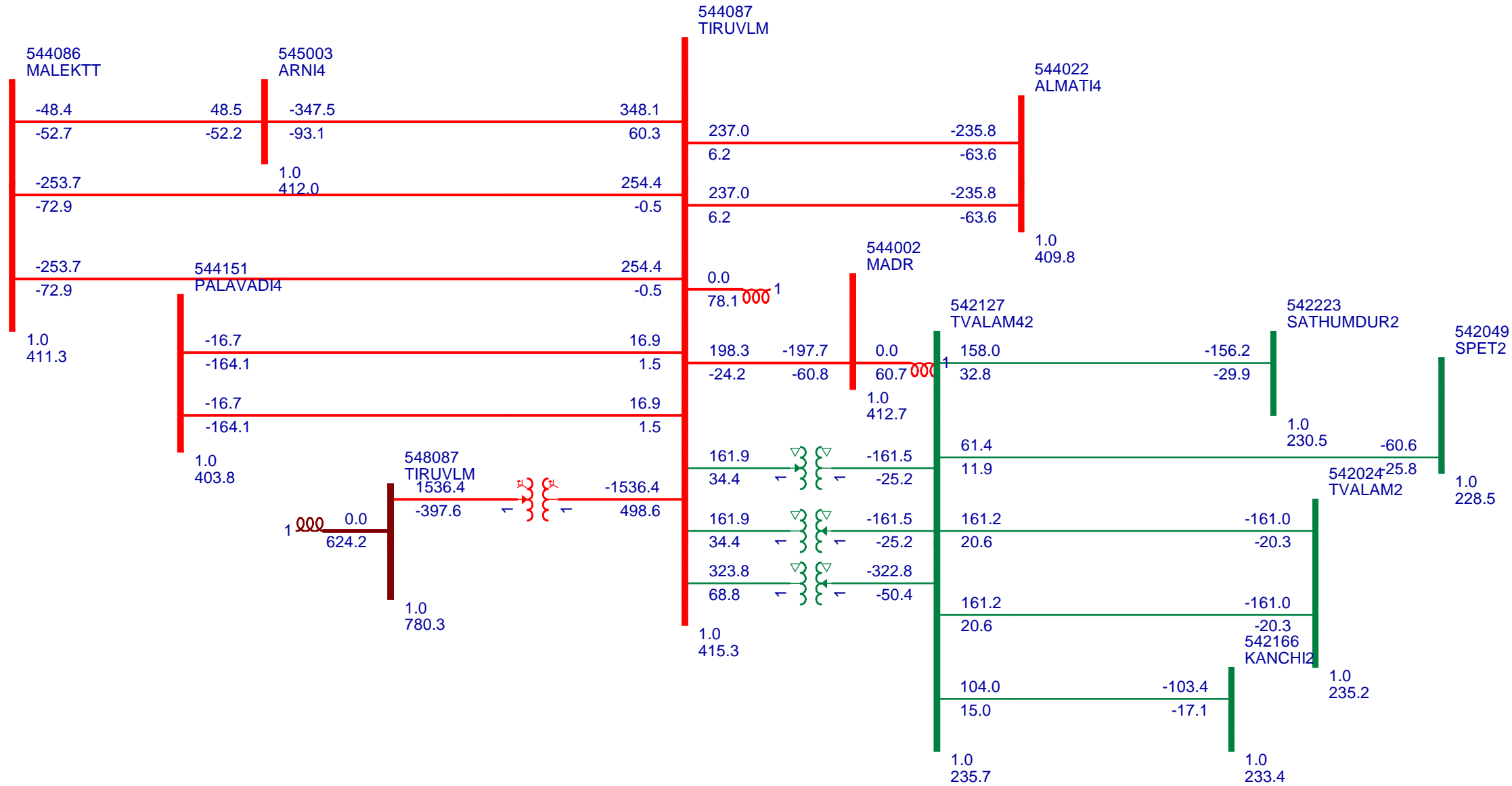
BASECASE FW : WITH THE EXISTING 2X315 MVA 400/230KV ICT AT THIRUVALAM SS



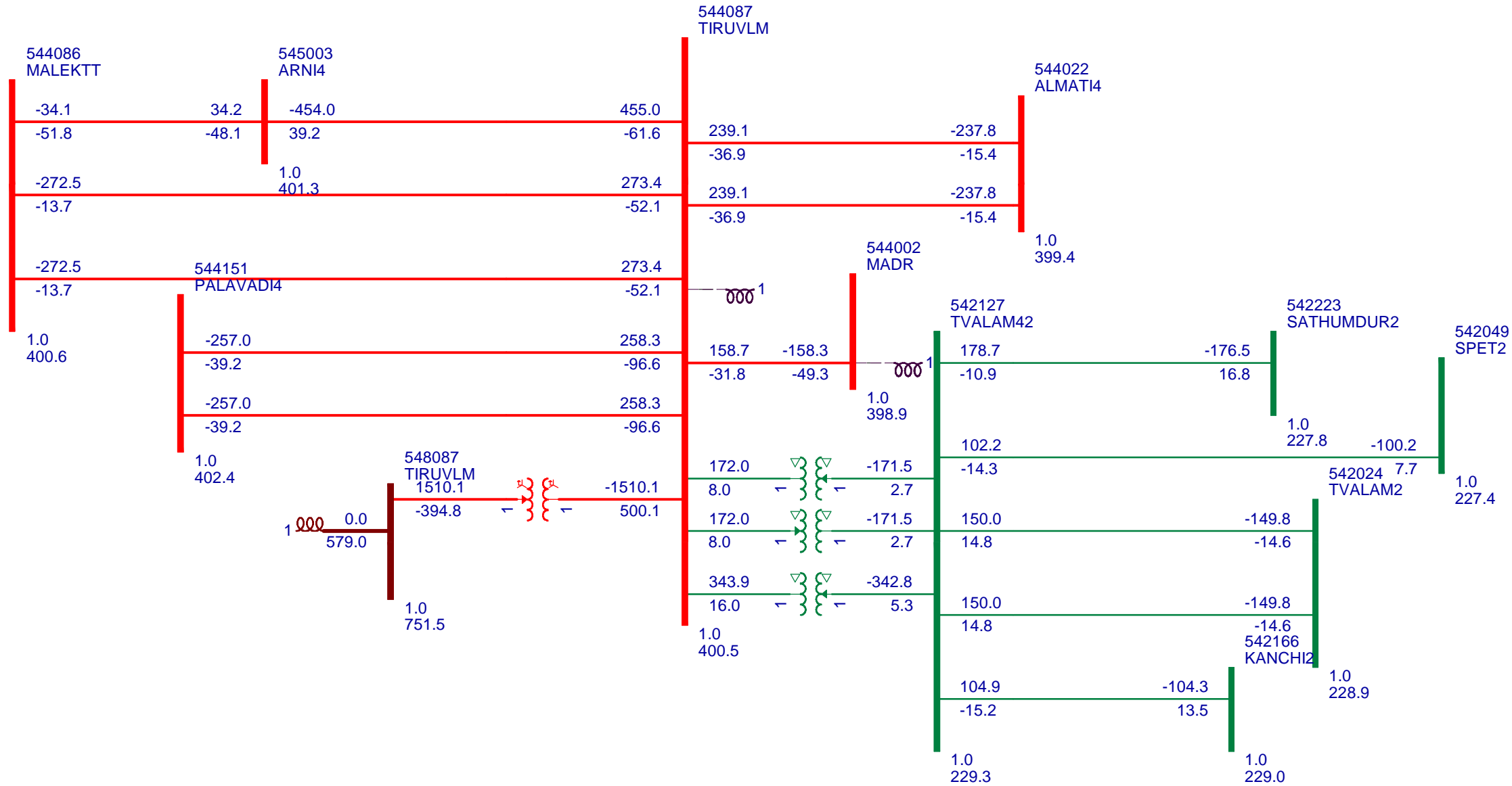
BASECASE NW : WITH THE EXISTING 2X315 MVA 400/230KV ICT AT THIRUVALAM 400KV SS



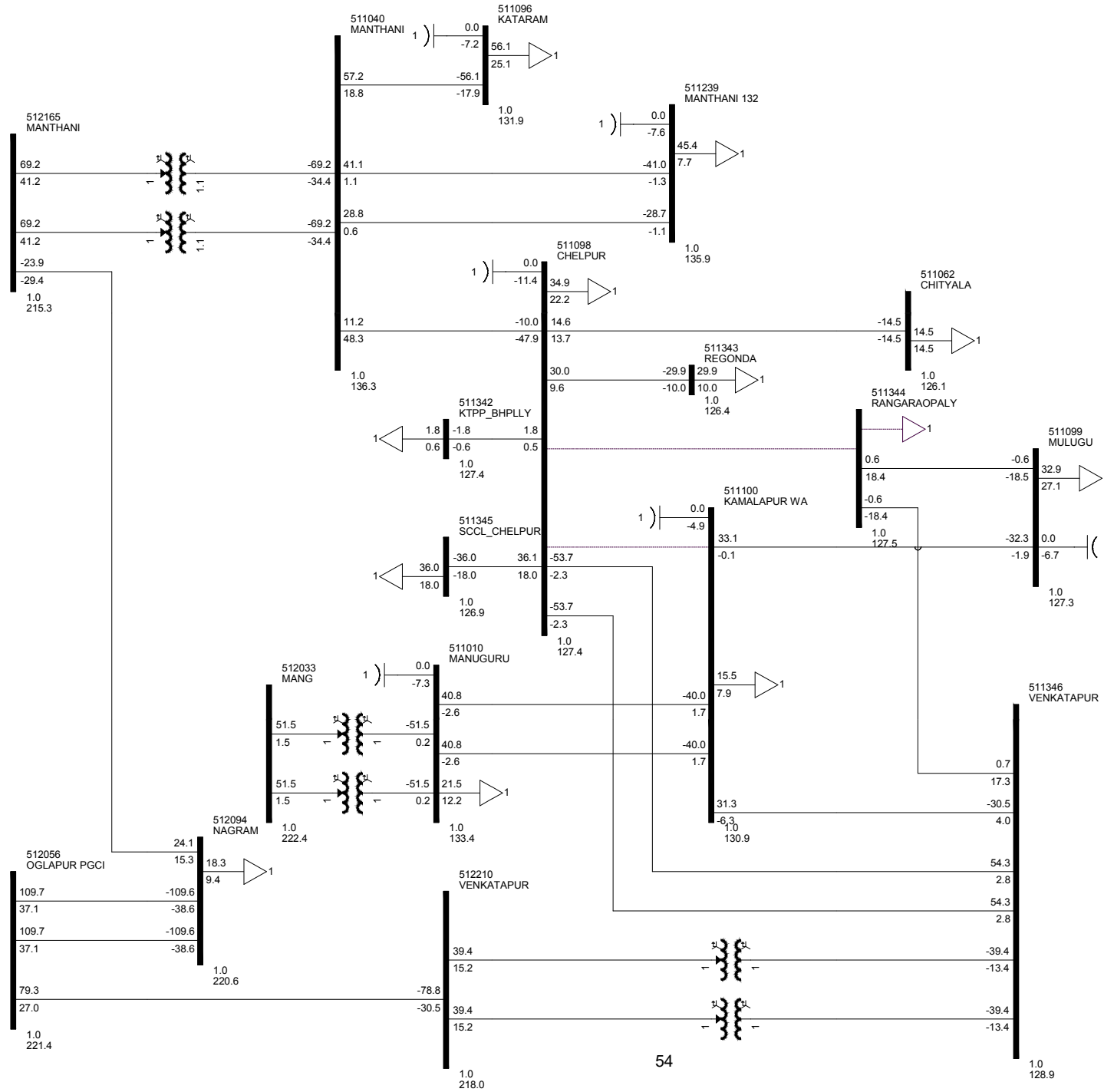
CASE1 FW : WITH THE PROPOSED ADDITIONAL 1X500MVA 400/230KV ICT AT THIRUVALAM



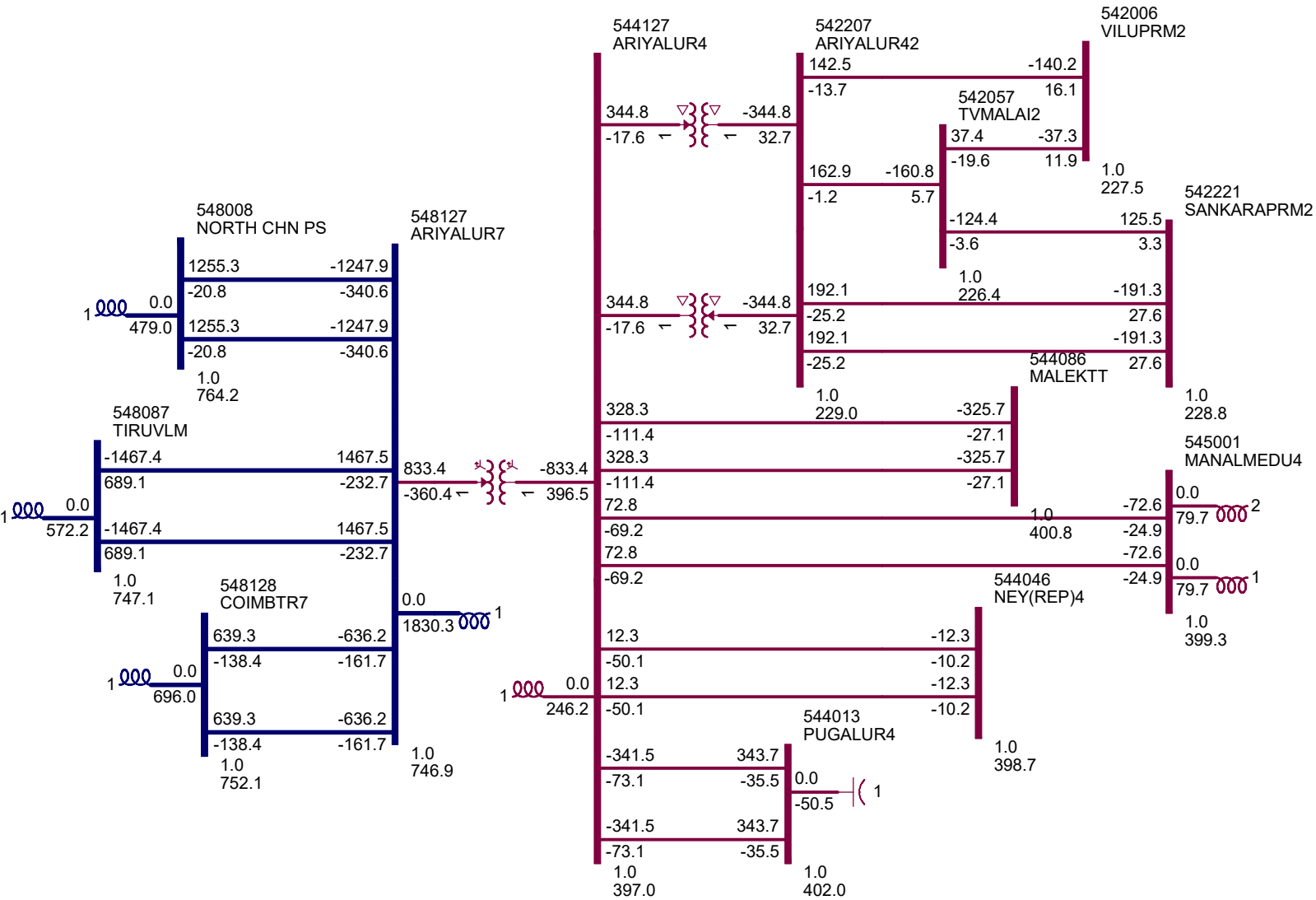
CASE1 NW : WITH THE PROPOSED ADDITIONAL 1X500MVA 400/230KV ICT AT THIRUVALAM



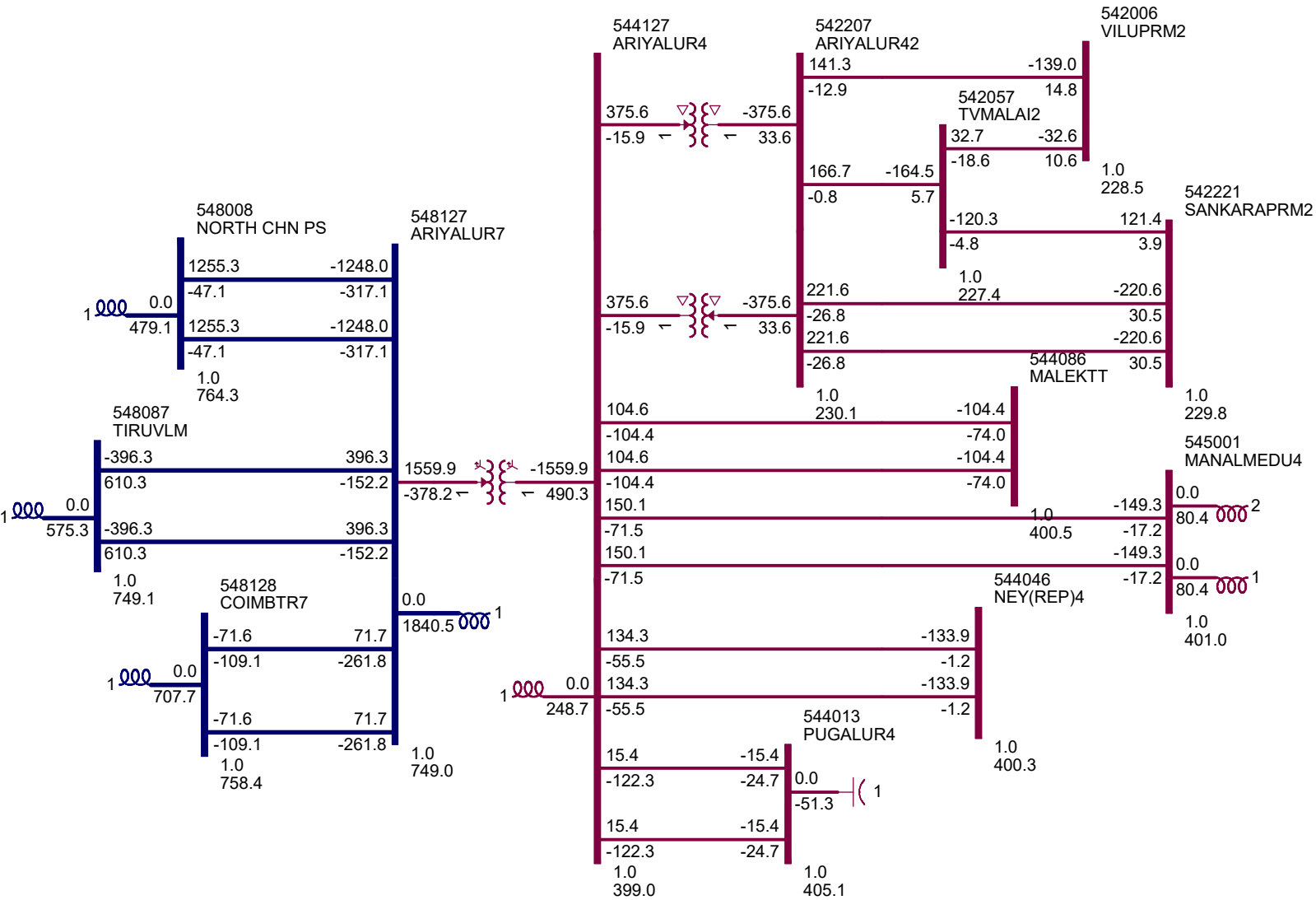
Proposal for erection of 220kV DC/SC line (ACSR Single Moose) from 400/220kV Oglapur (PGCIL) SS to proposed 220/132kV Venkatapur SS (42KM)



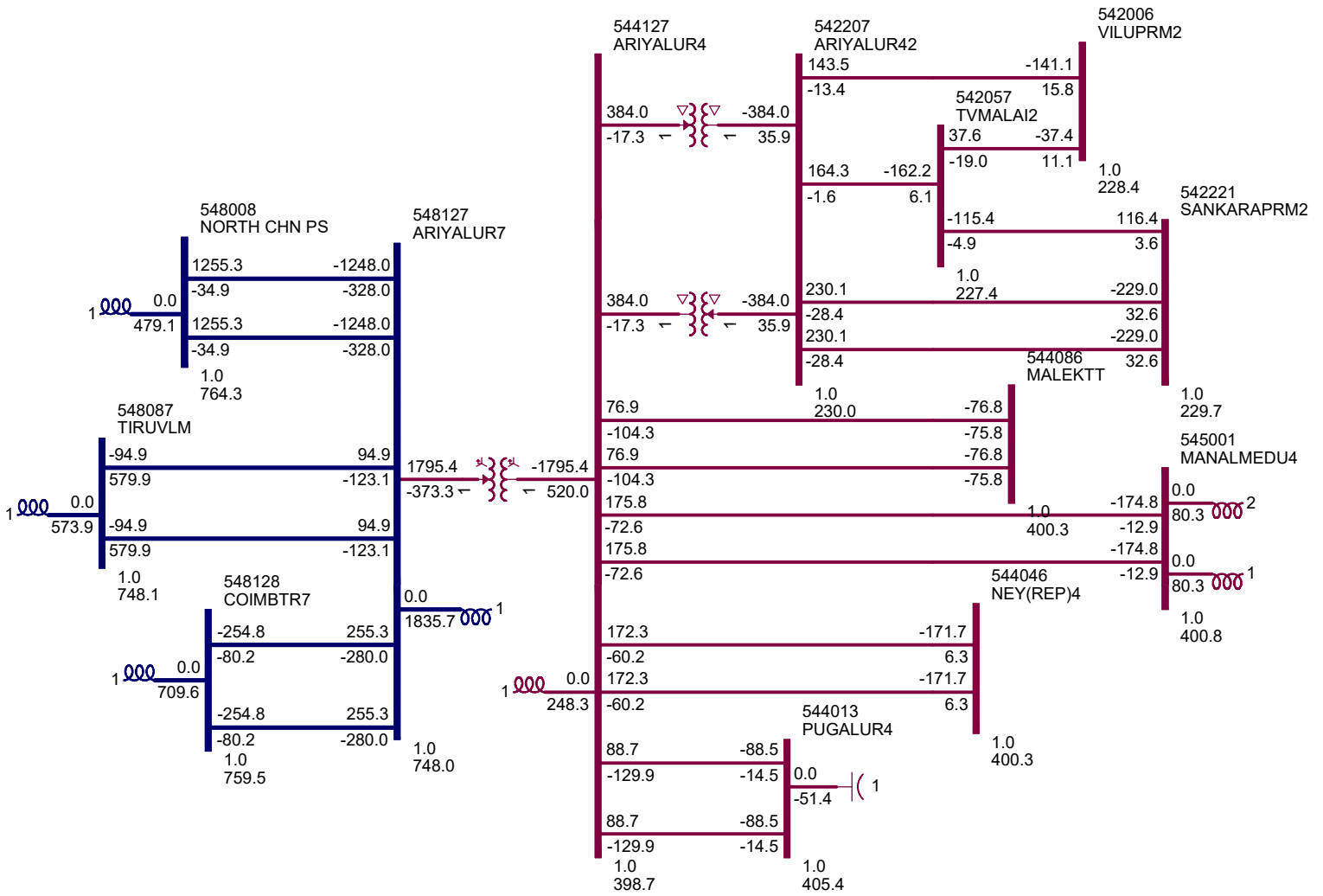
INTRODUCTION OF 400/230 KV RATIO IN ARIYALUR 765/400 KV SS, Full wind Full solar



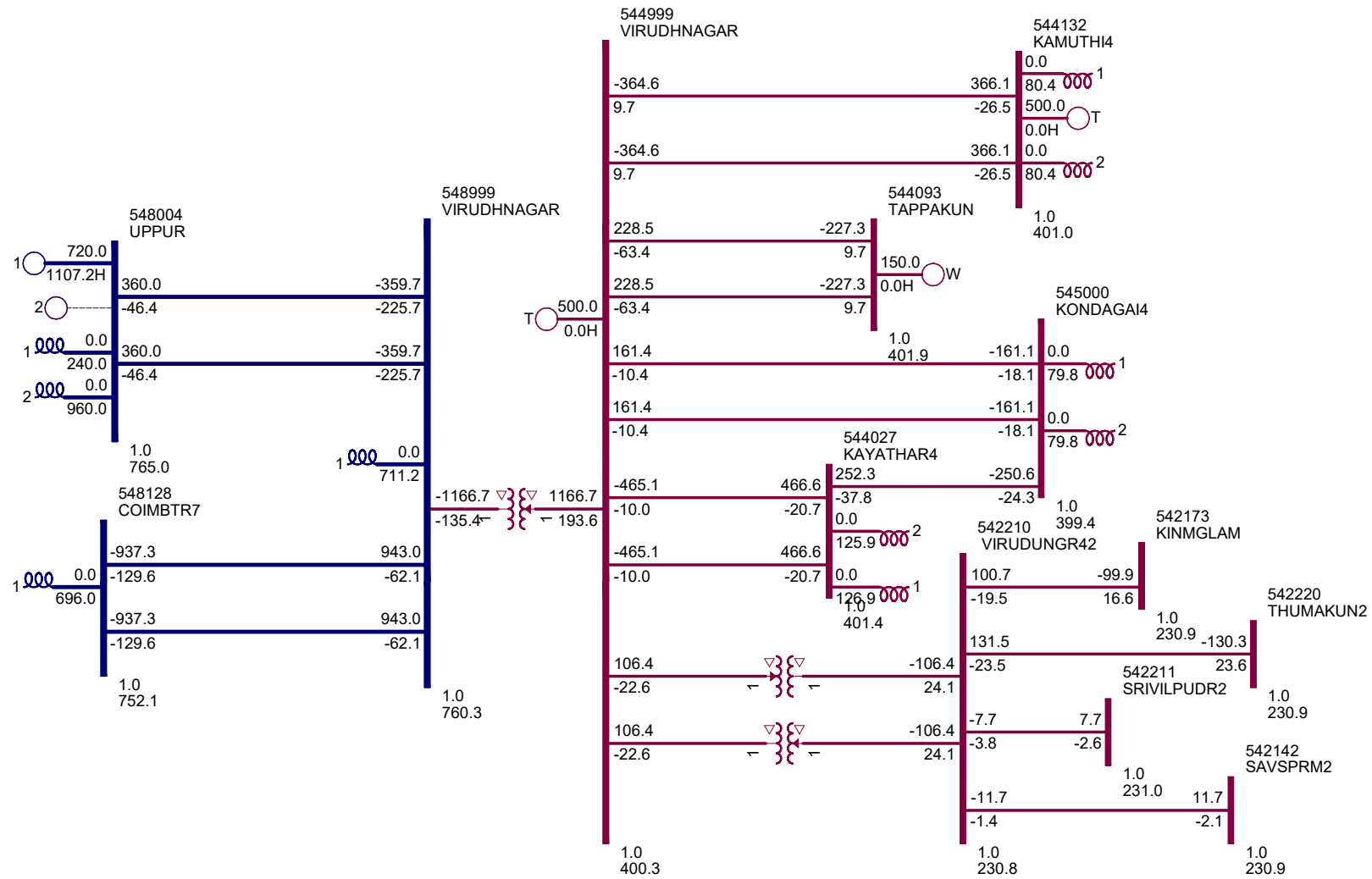
INTRODUCTION OF 400/230 KV RATIO IN ARIYALUR 765/400 KV SS, Nil wind Full solar



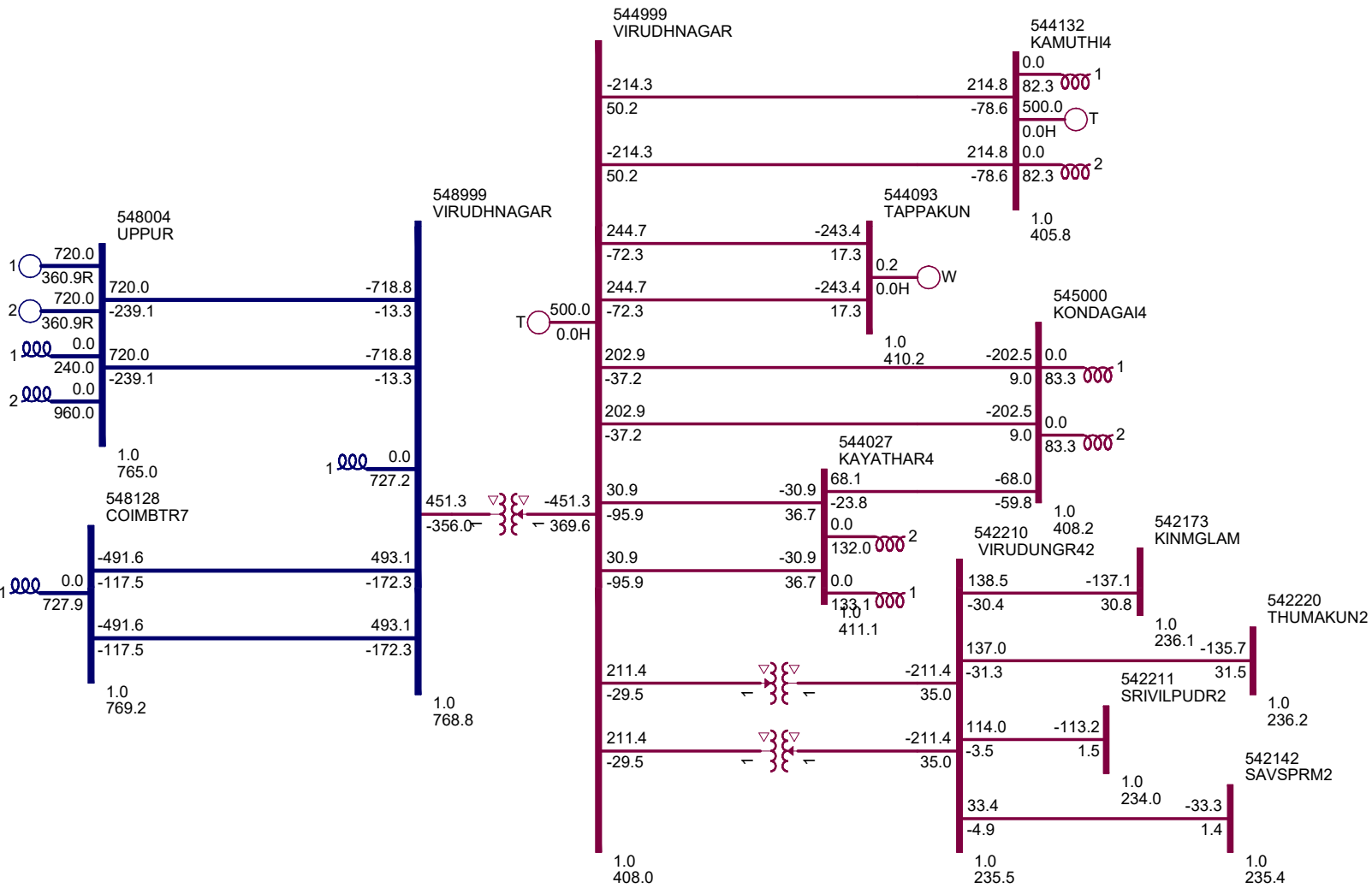
INTRODUCTION OF 400/230 KV RATIO IN ARIYALUR 765/400 KV SS, Nil wind Nil solar, full hydro



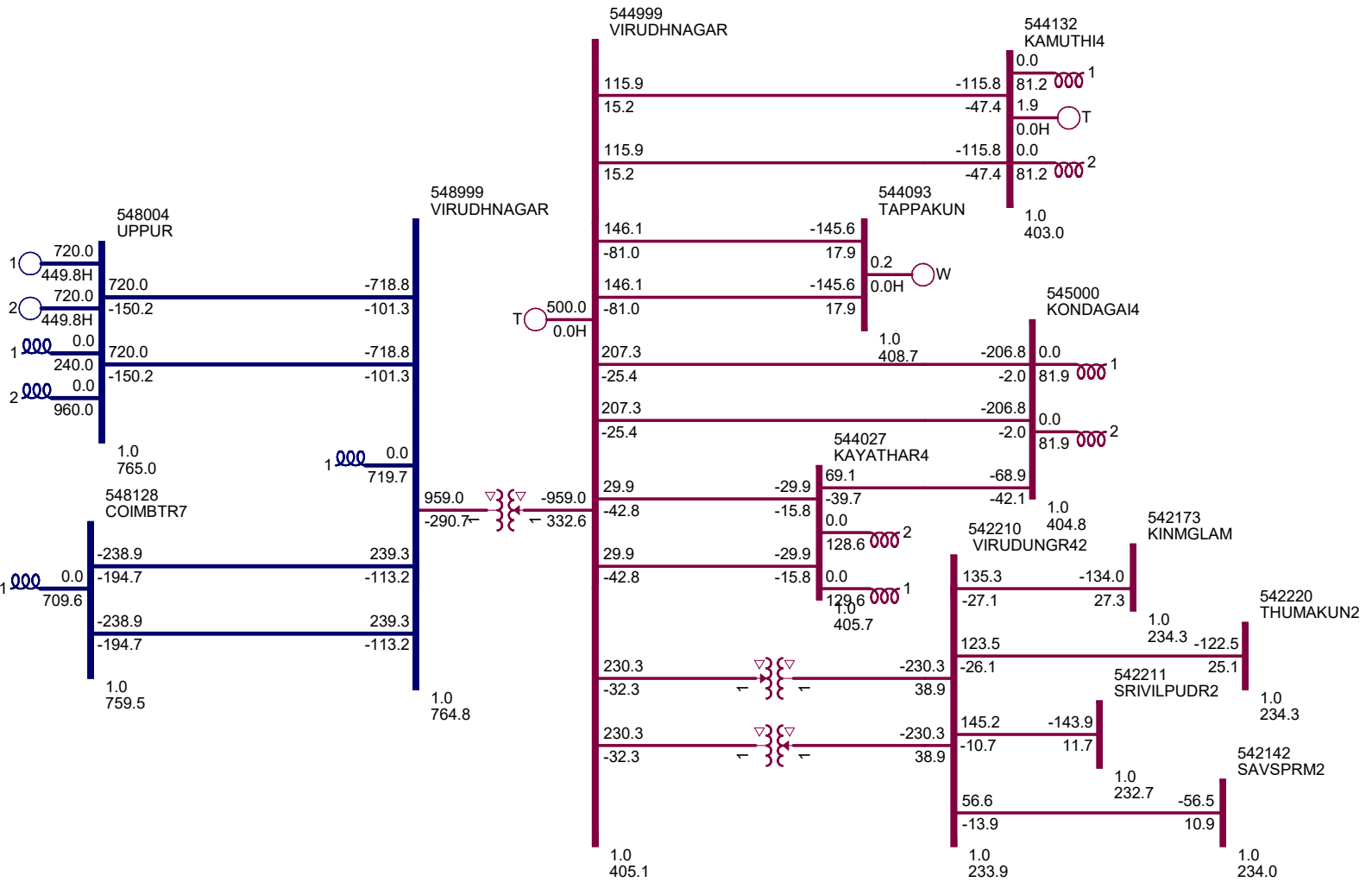
INTRODUCTION OF 400/230 KV RATIO IN VIRUDHUNAGAR 765/400 KV SS Full wind Full Solar

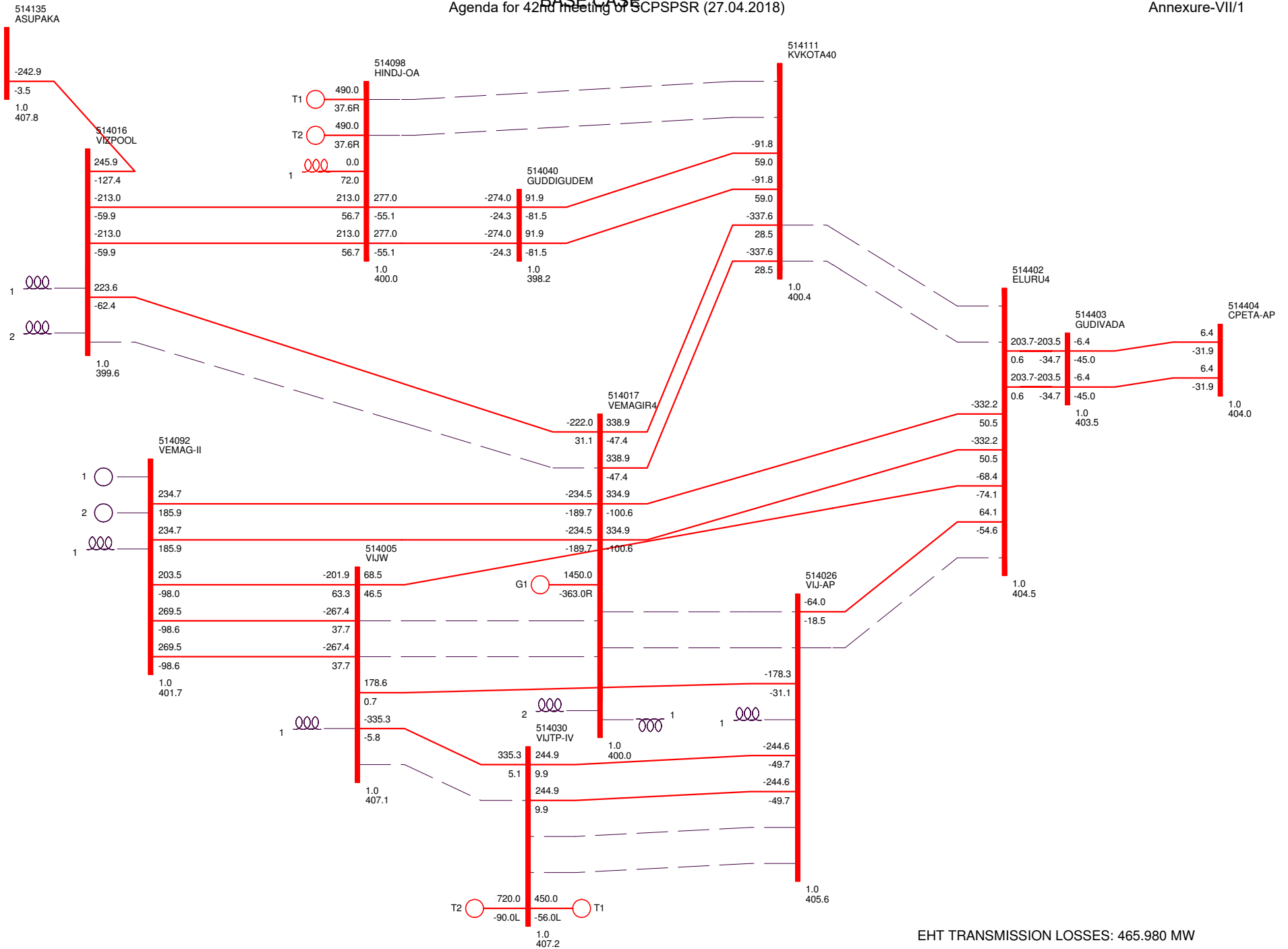


INTRODUCTION OF 400/230 KV RATIO IN VIRUDHUNAGAR 765/400 KV SS Nil Wind Full Solar



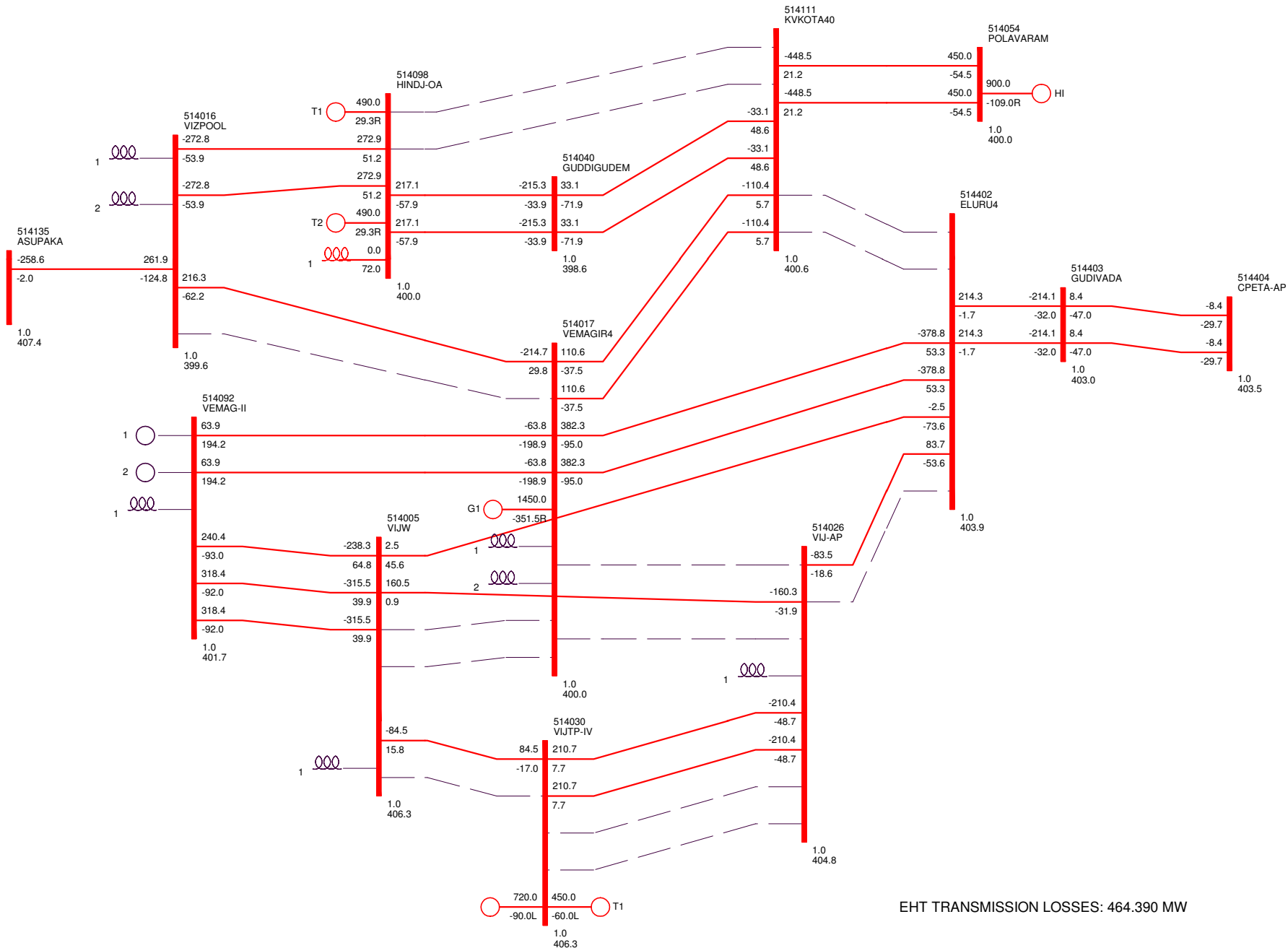
INTRODUCTION OF 400/230 KV RATIO IN VIRUDHUNAGAR 765/400 KV SS Nil Wind Nil Solar full hydro



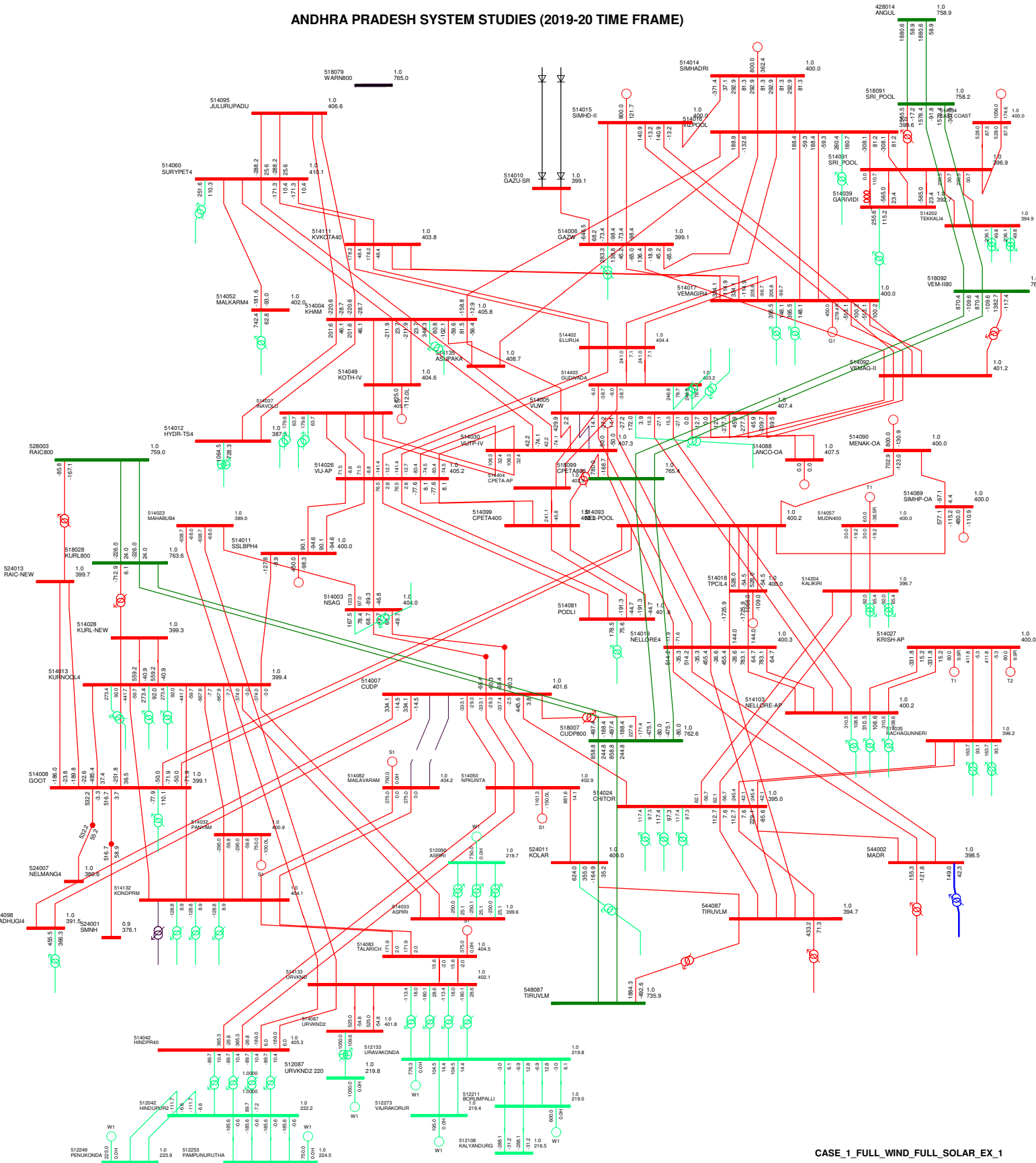


EHT TRANSMISSION LOSSES: 465.980 MW

WITH POLAVARAM (12 X 80 MW) EVACUATION
 Agenda for 42nd meeting of SCPSPSR (27.04.2018)

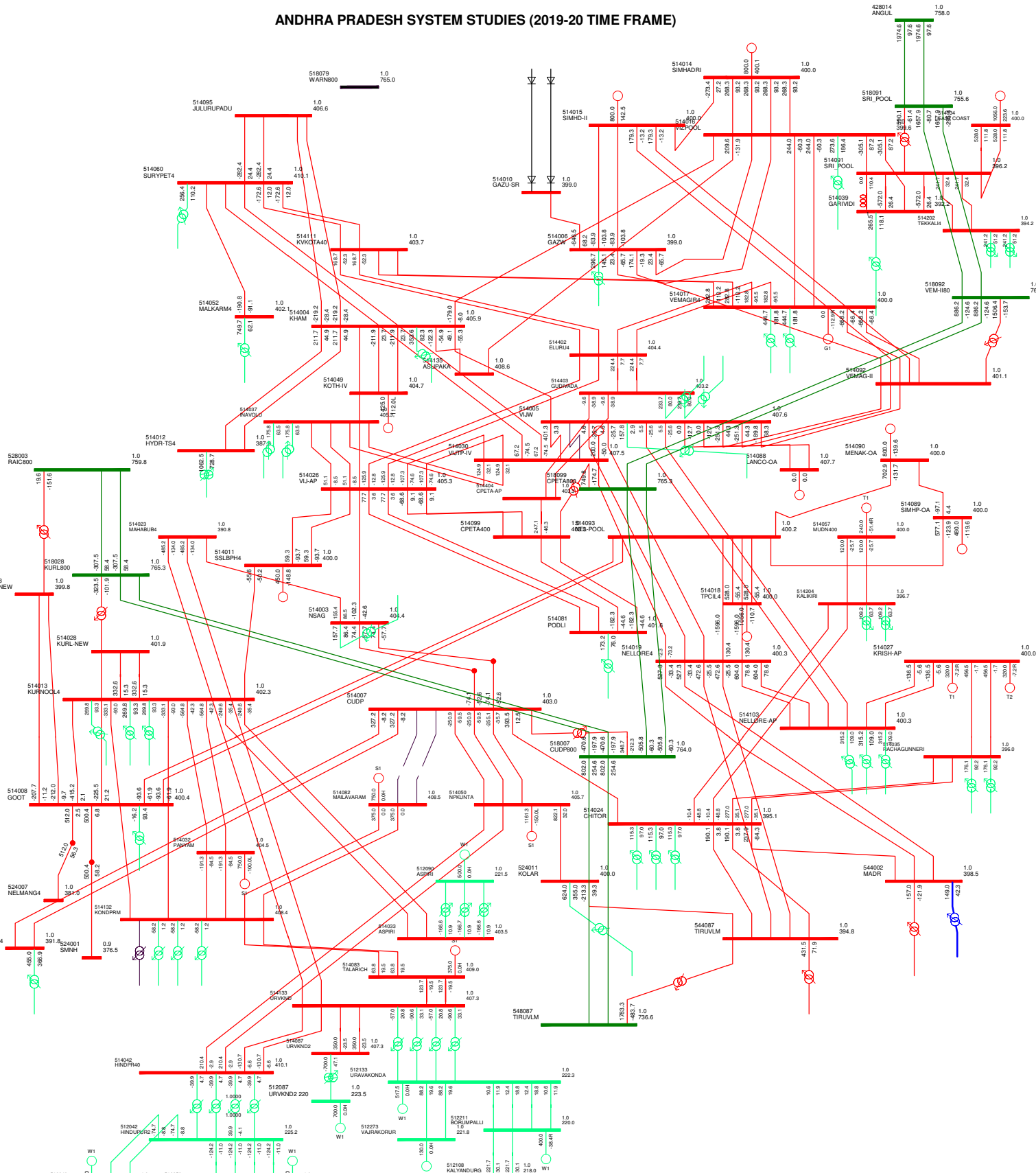


ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



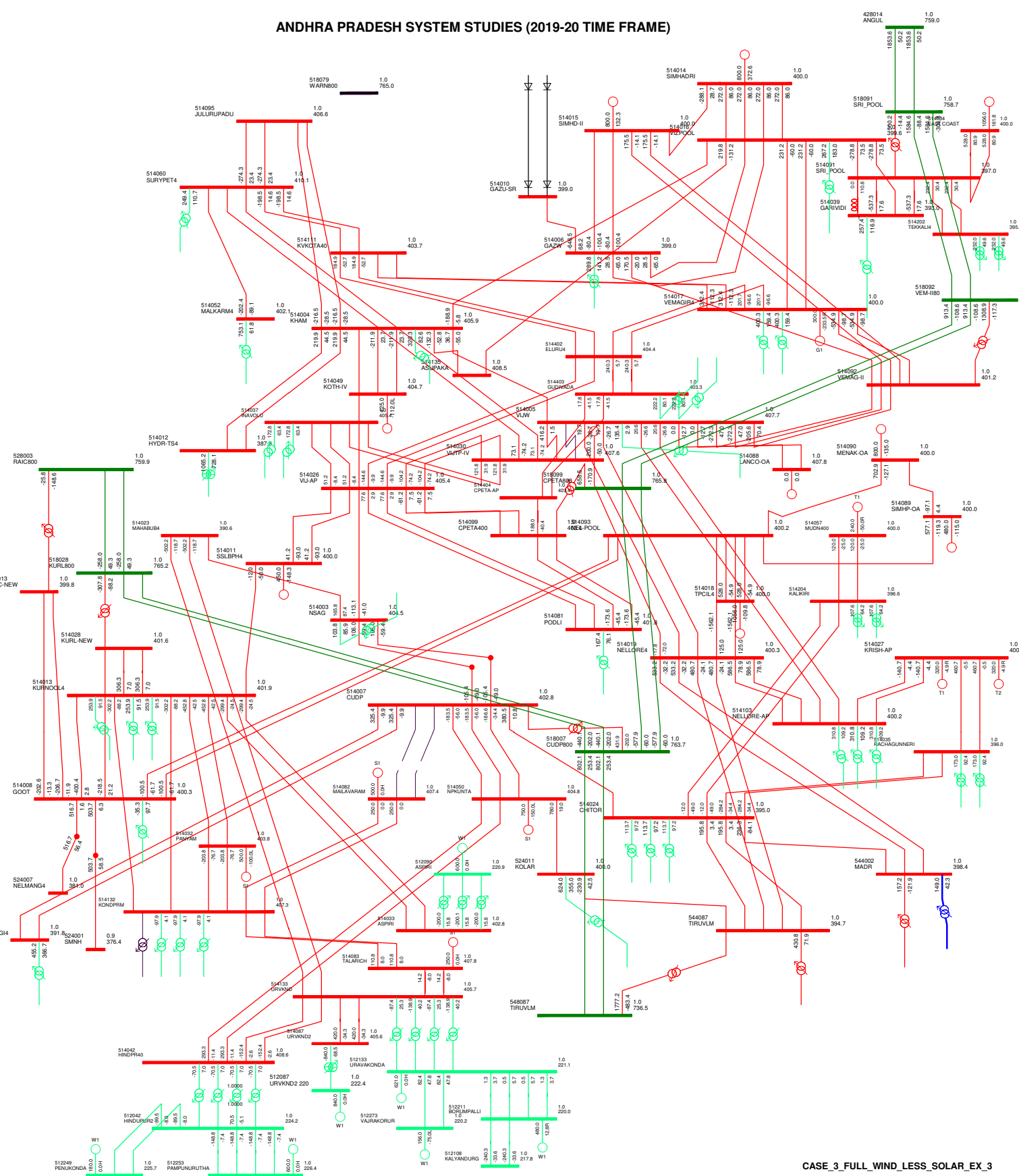
CASE_1_FULL_WIND_FULL_SOLAR_EX_1

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



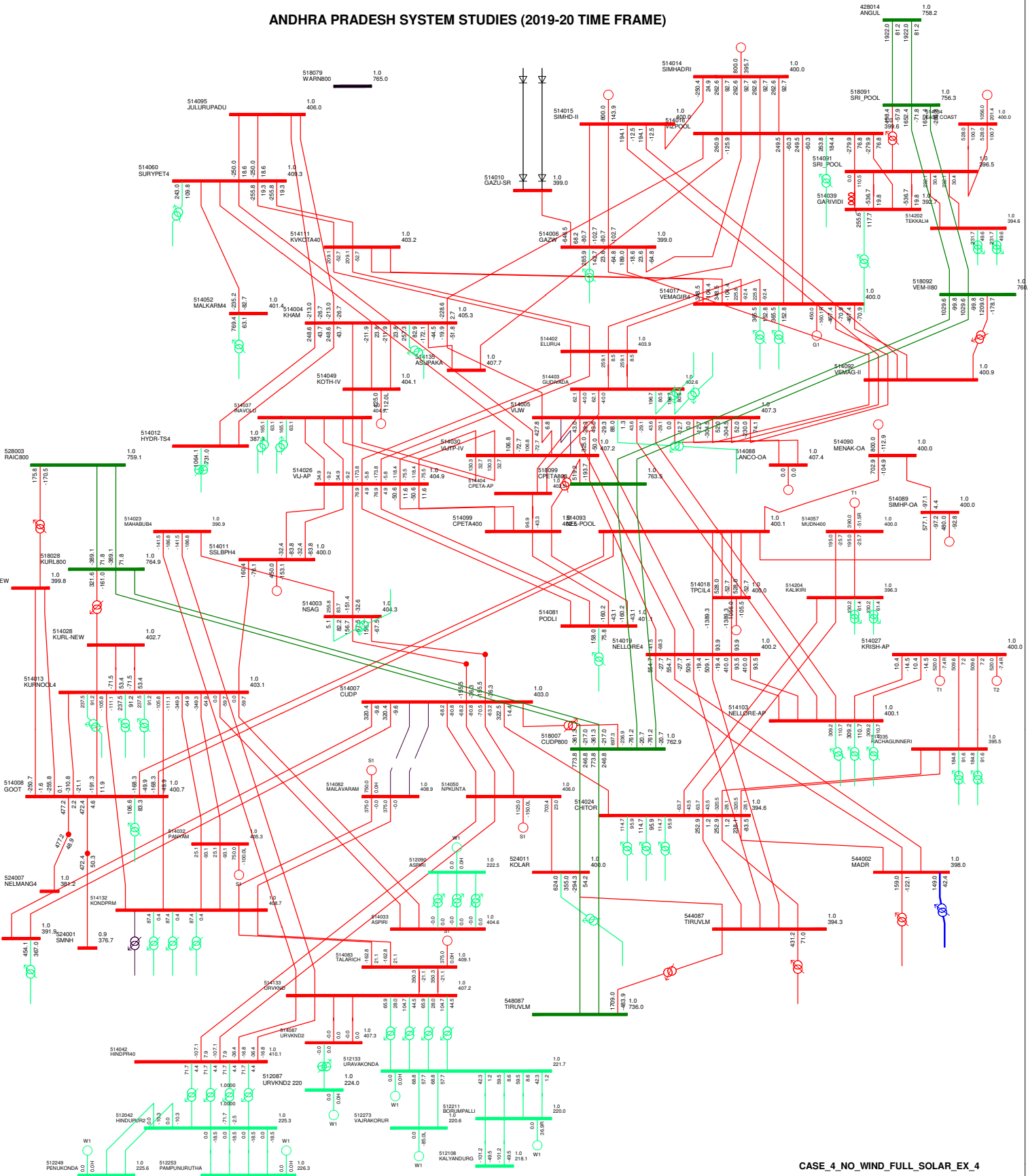
CASE_2_LESS_WIND_FULL_SOLAR_EX_2

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



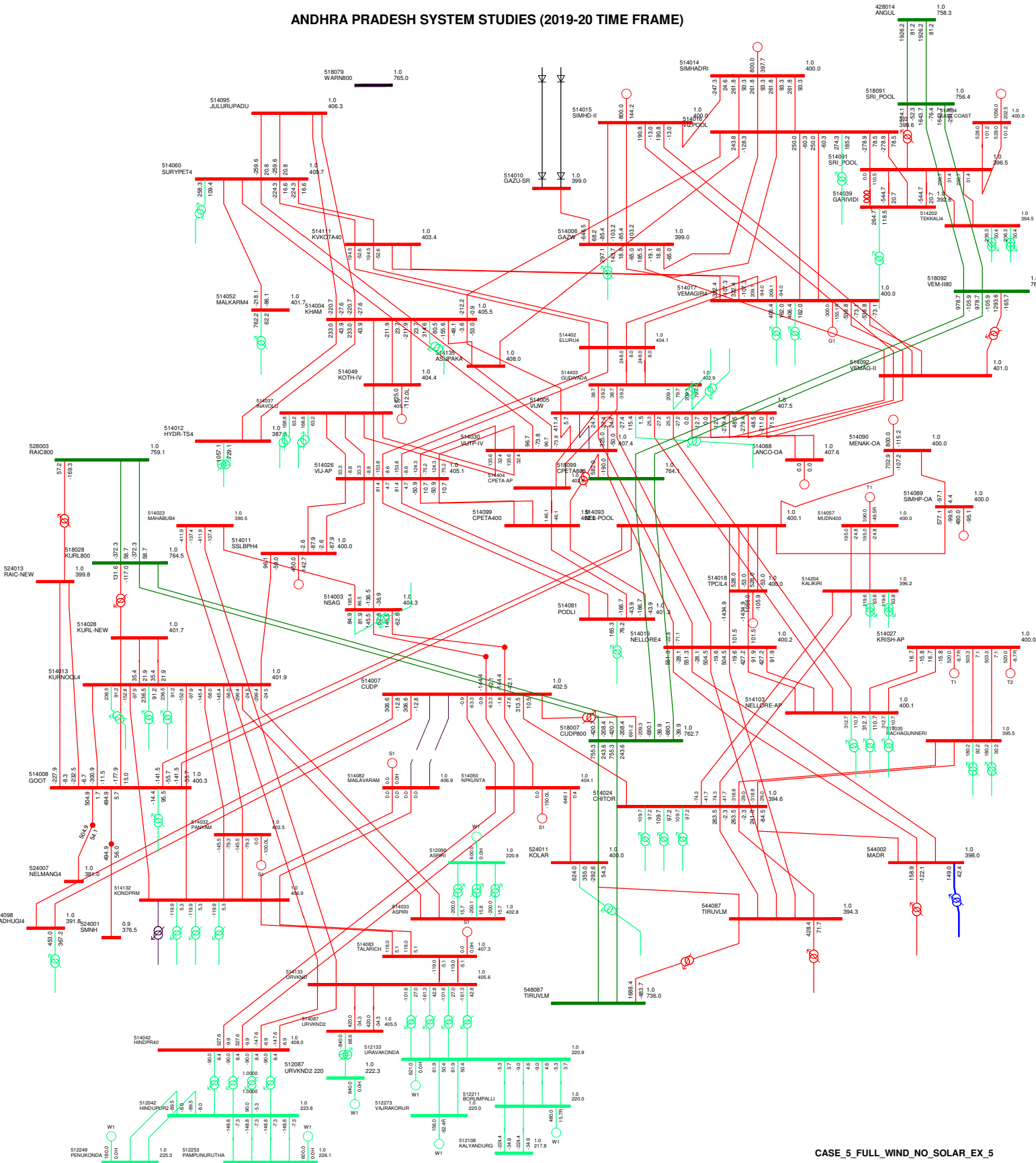
CASE_3_FULL_WIND_LESS_SOLAR_EX_3

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



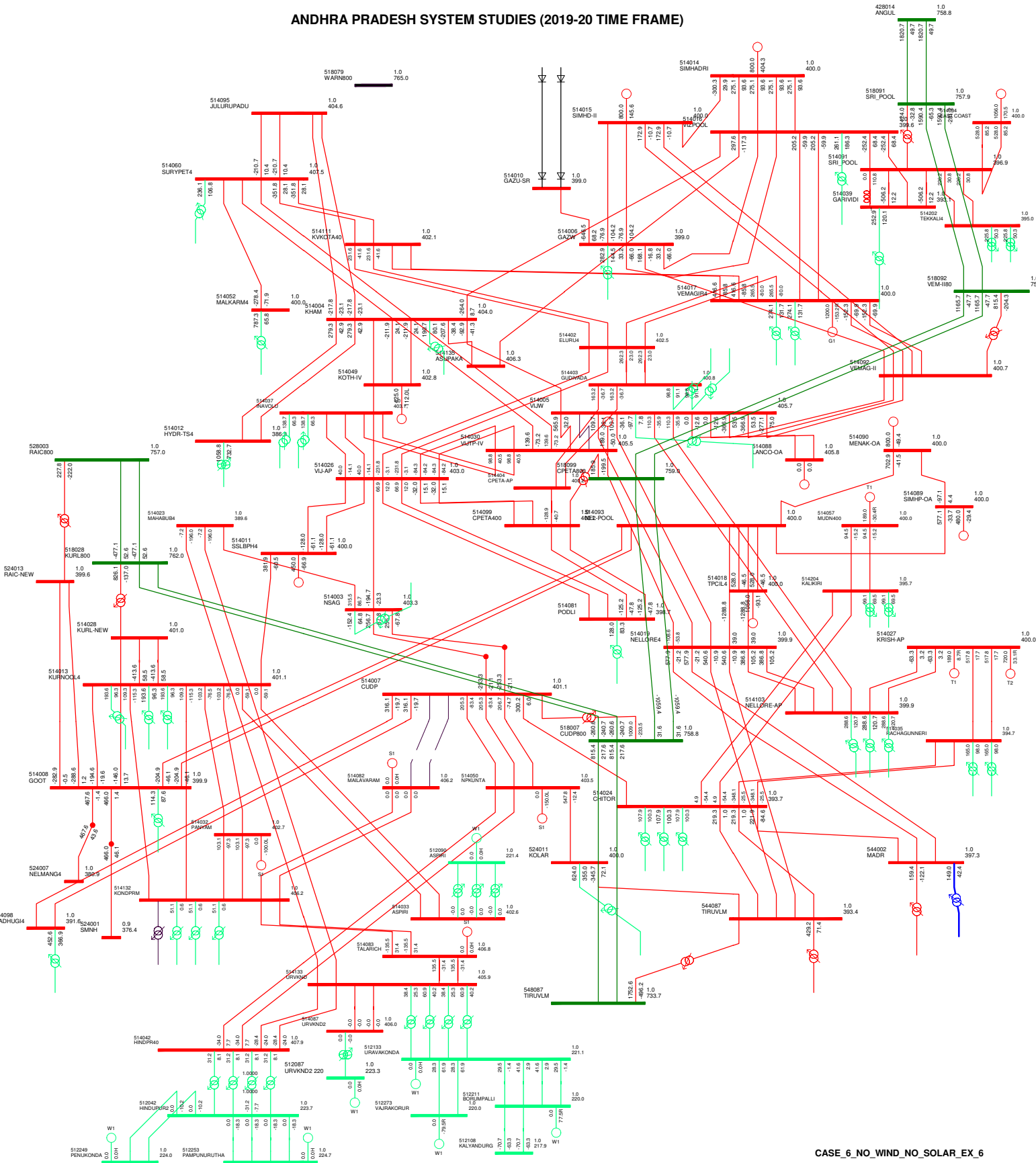
CASE_4_NO_WIND_FULL_SOLAR_EX_4

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



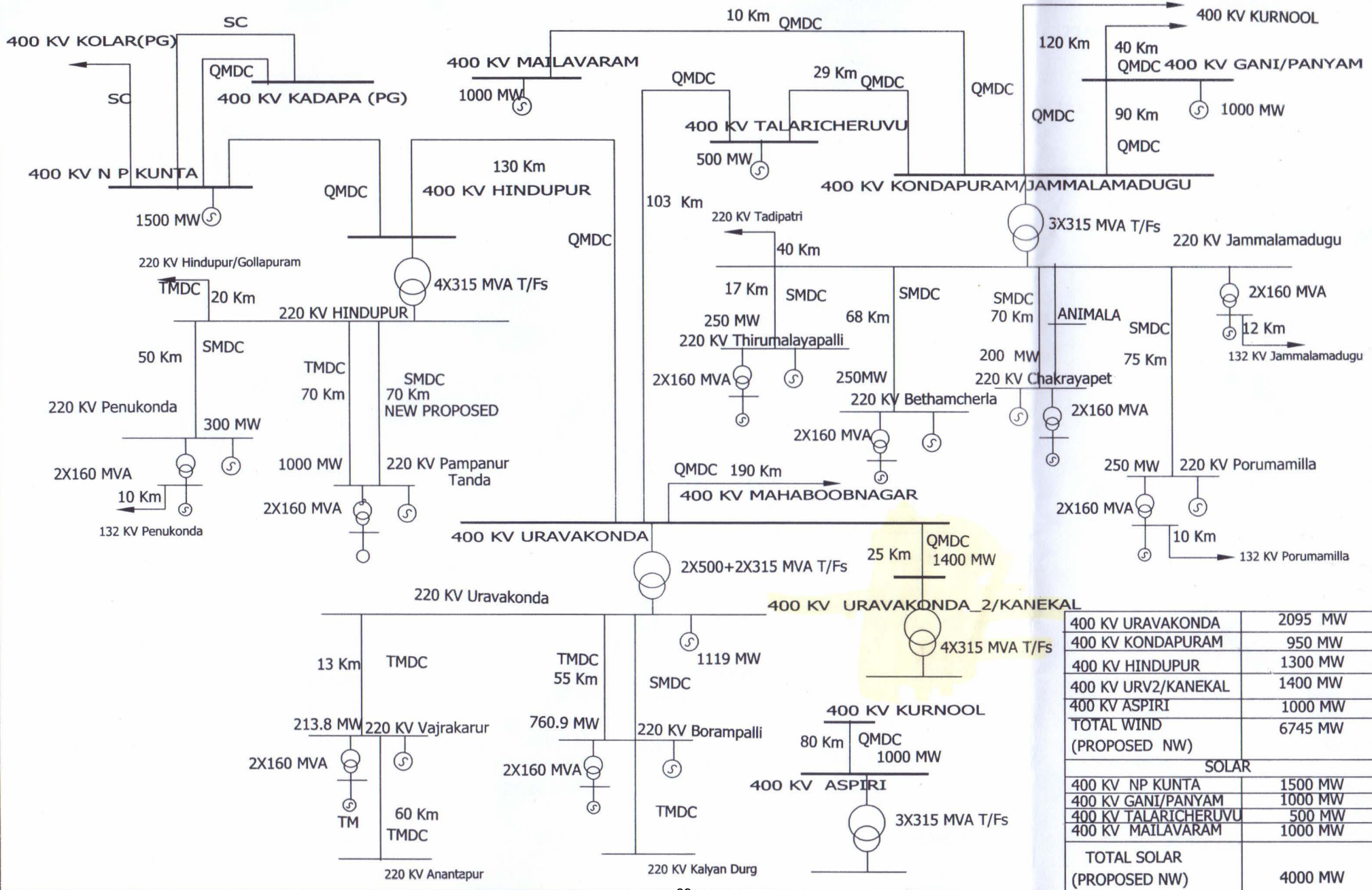
CASE_5_FULL_WIND_NO_SOLAR_EX_5

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)

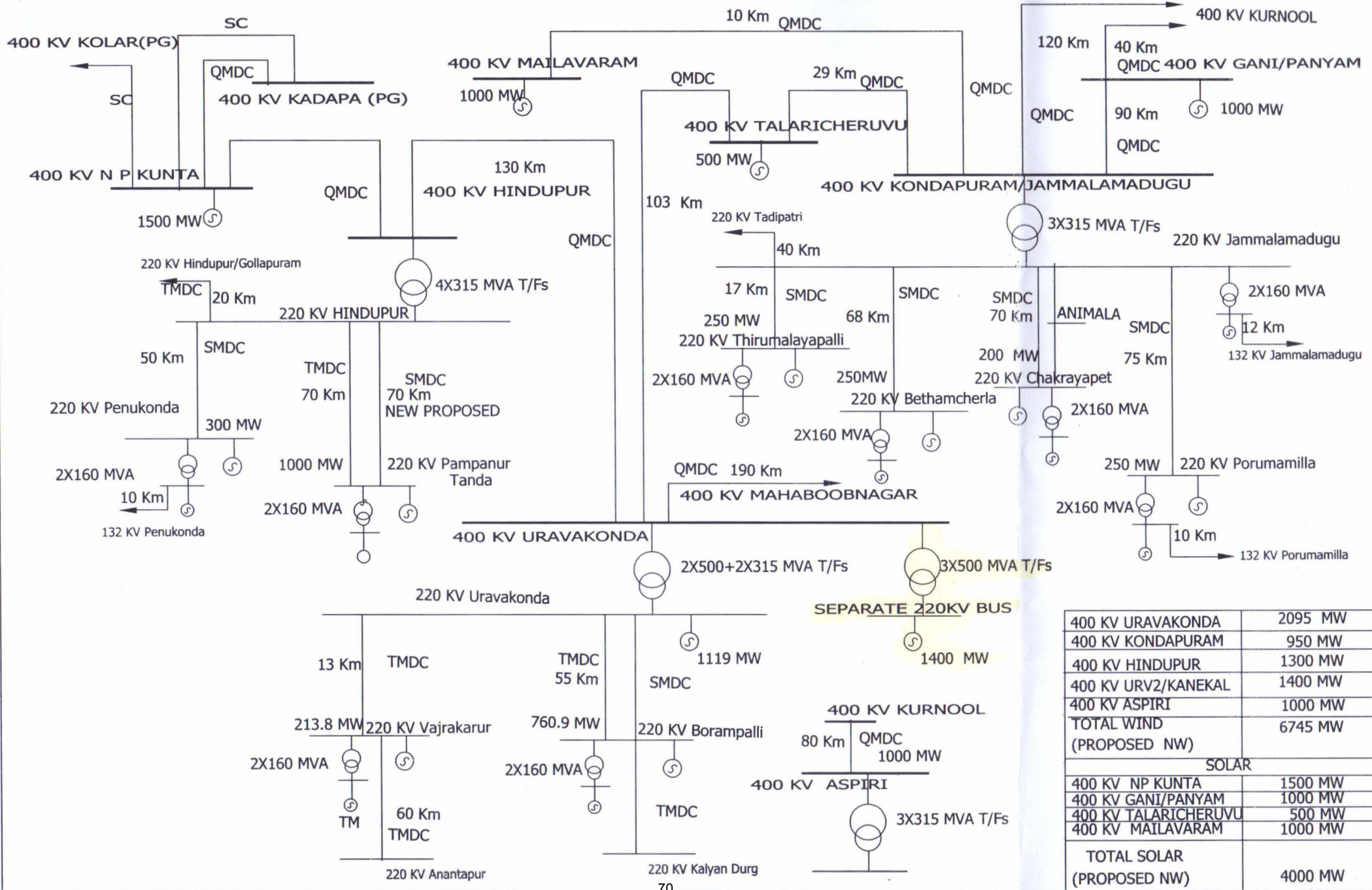


CASE_6_NO_WIND_NO_SOLAR_EX_6

EVACUATION SCHEME OF WIND POWER PROJECTS COMING UP IN AP in Kadapa, Ananthapur & Kurnool Districts

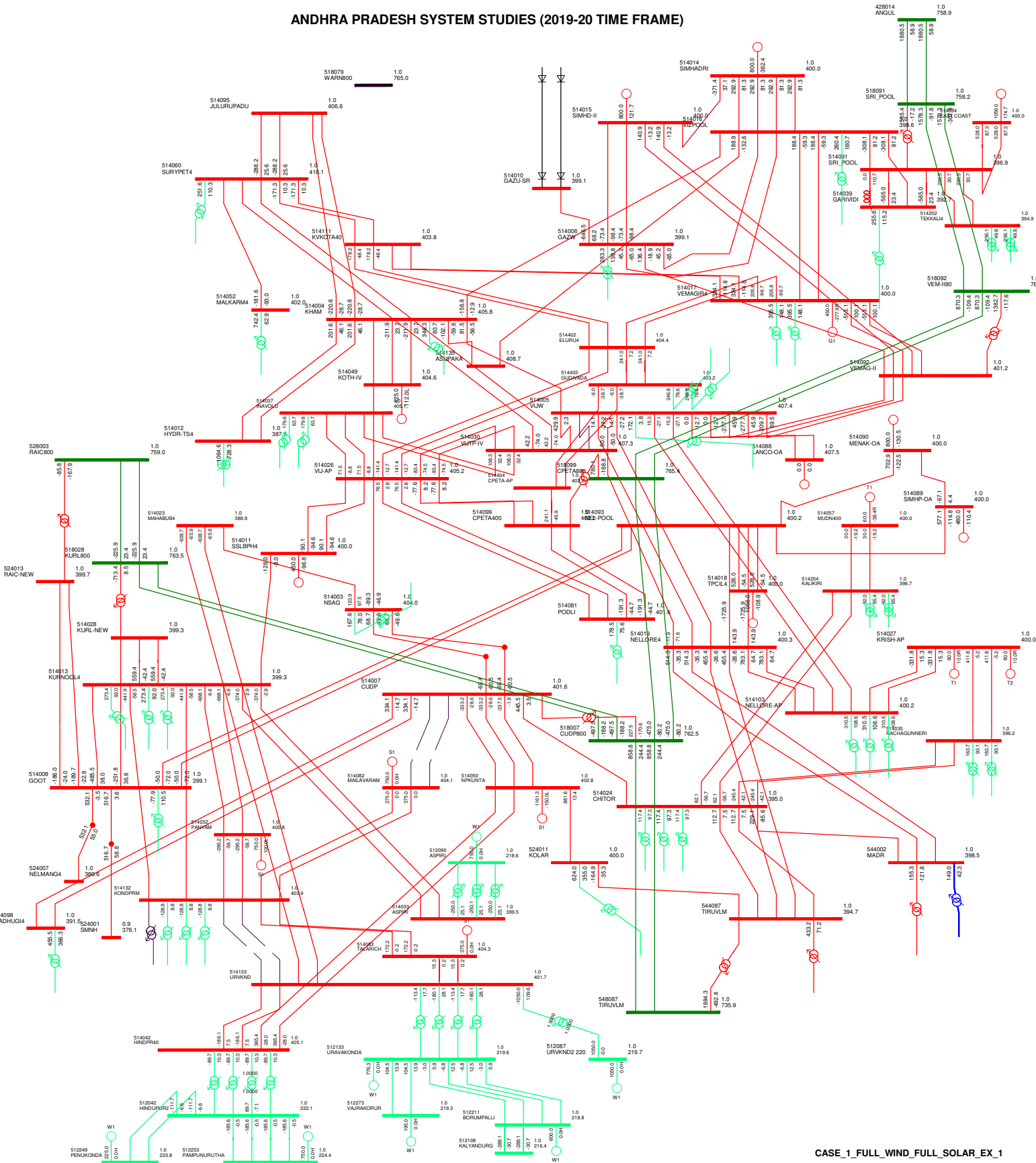


MODIFIED SCHEME FOR EVACUATION OF WIND & SOLAR POWER PROJECTS COMING UP IN AP in Kadapa, Ananthapur & Kurnool Districts



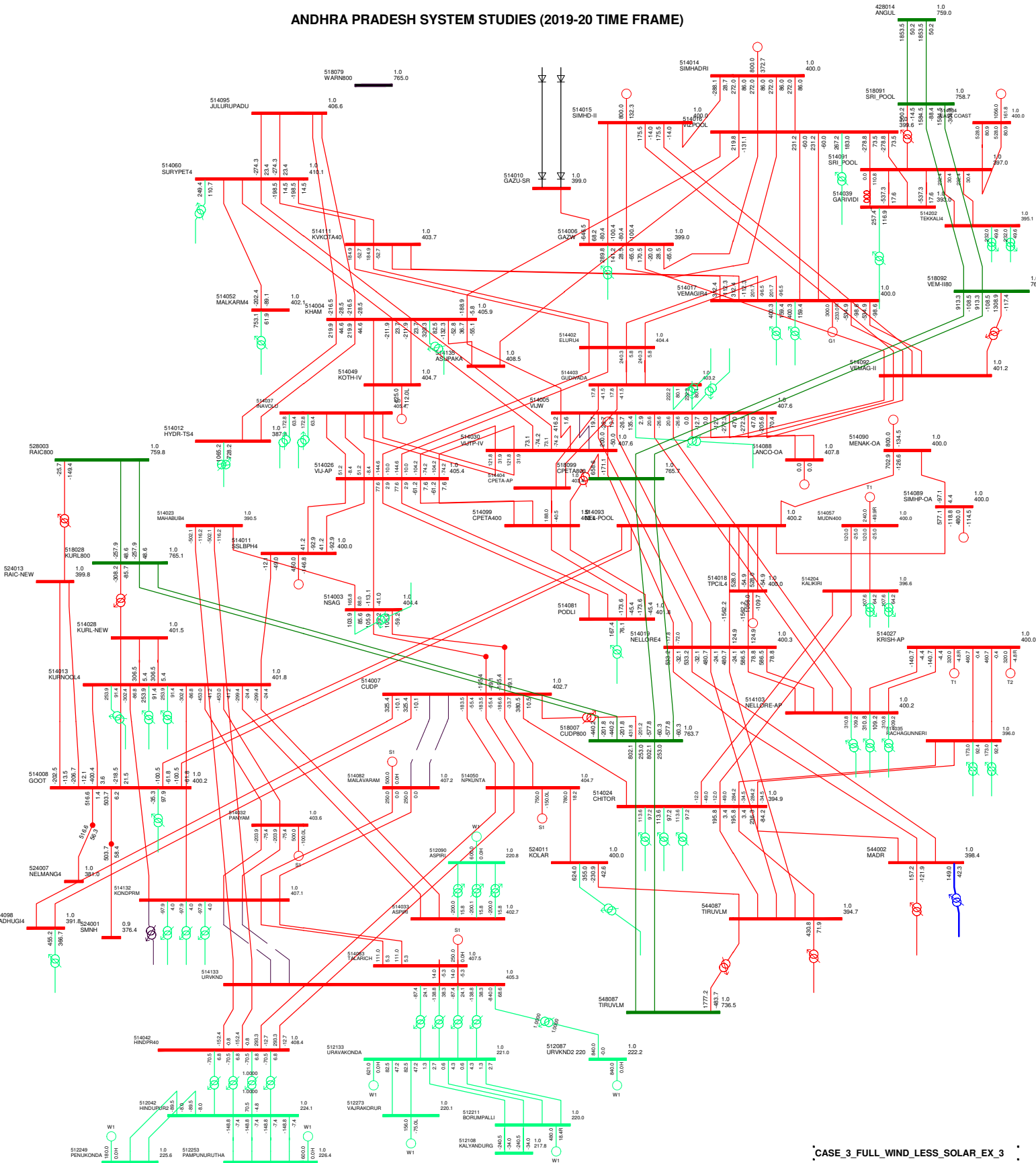
400 KV URAVAKONDA	2095 MW
400 KV KONDAPURAM	950 MW
400 KV HINDUPUR	1300 MW
400 KV URV2/KANEKAL	1400 MW
400 KV ASPIRI	1000 MW
TOTAL WIND (PROPOSED NW)	6745 MW
SOLAR	
400 KV NP KUNTA	1500 MW
400 KV GANI/PANYAM	1000 MW
400 KV TALARICHERUVU	500 MW
400 KV MAILAVARAM	1000 MW
TOTAL SOLAR (PROPOSED NW)	4000 MW

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



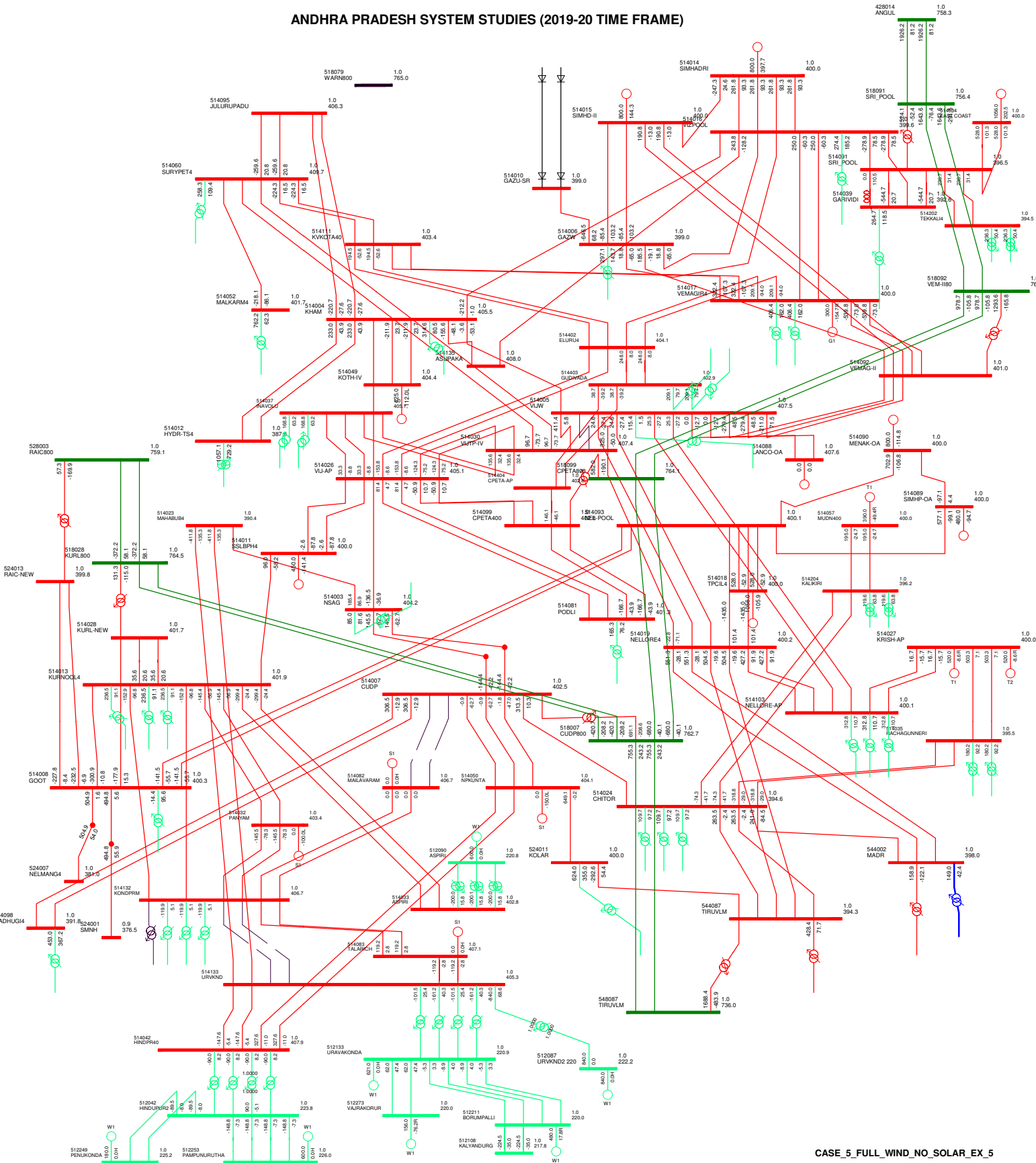
CASE_1_FULL_WIND_FULL_SOLAR_EX_1

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



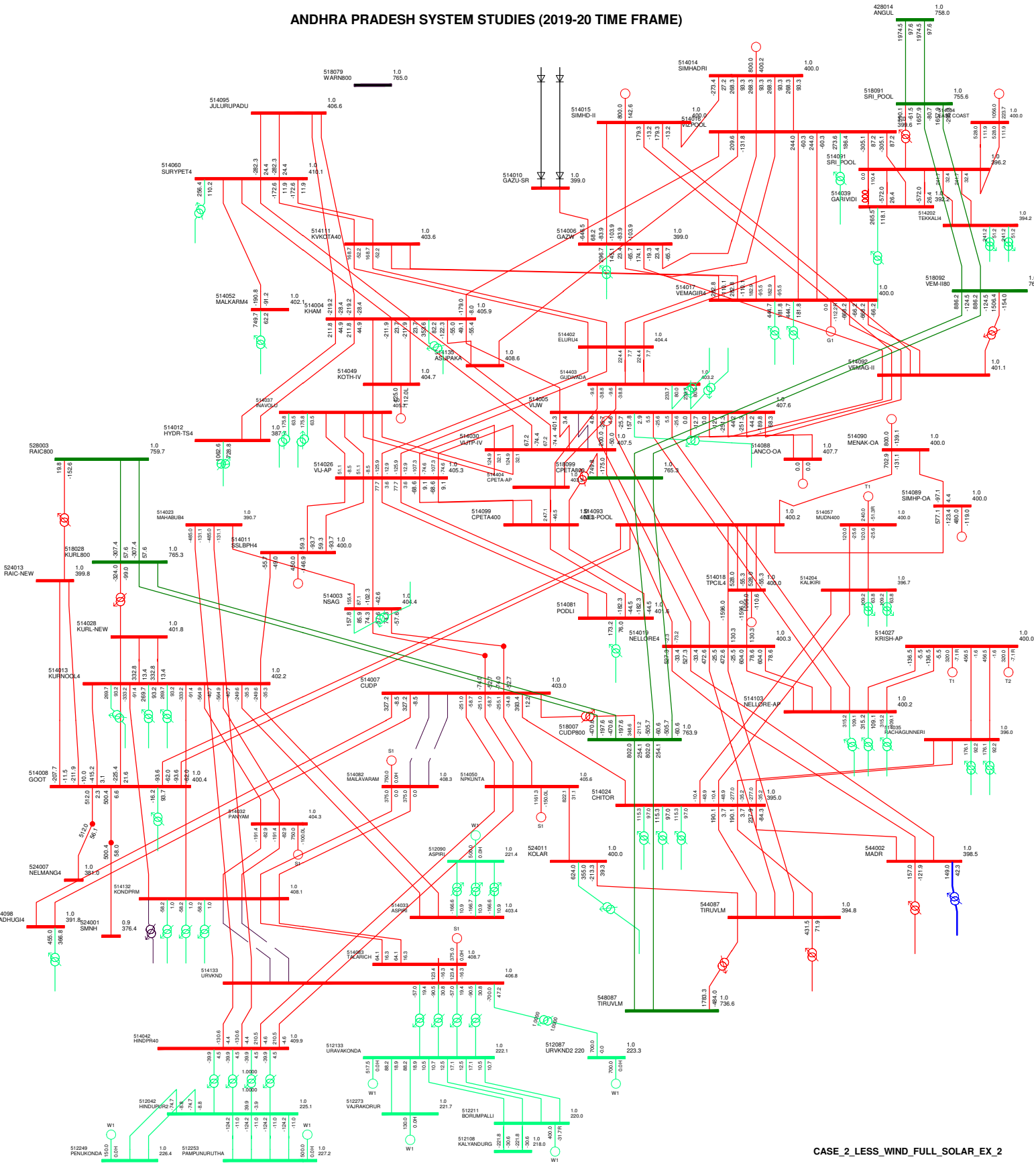
CASE_3_FULL_WIND_LESS_SOLAR_EX_3

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



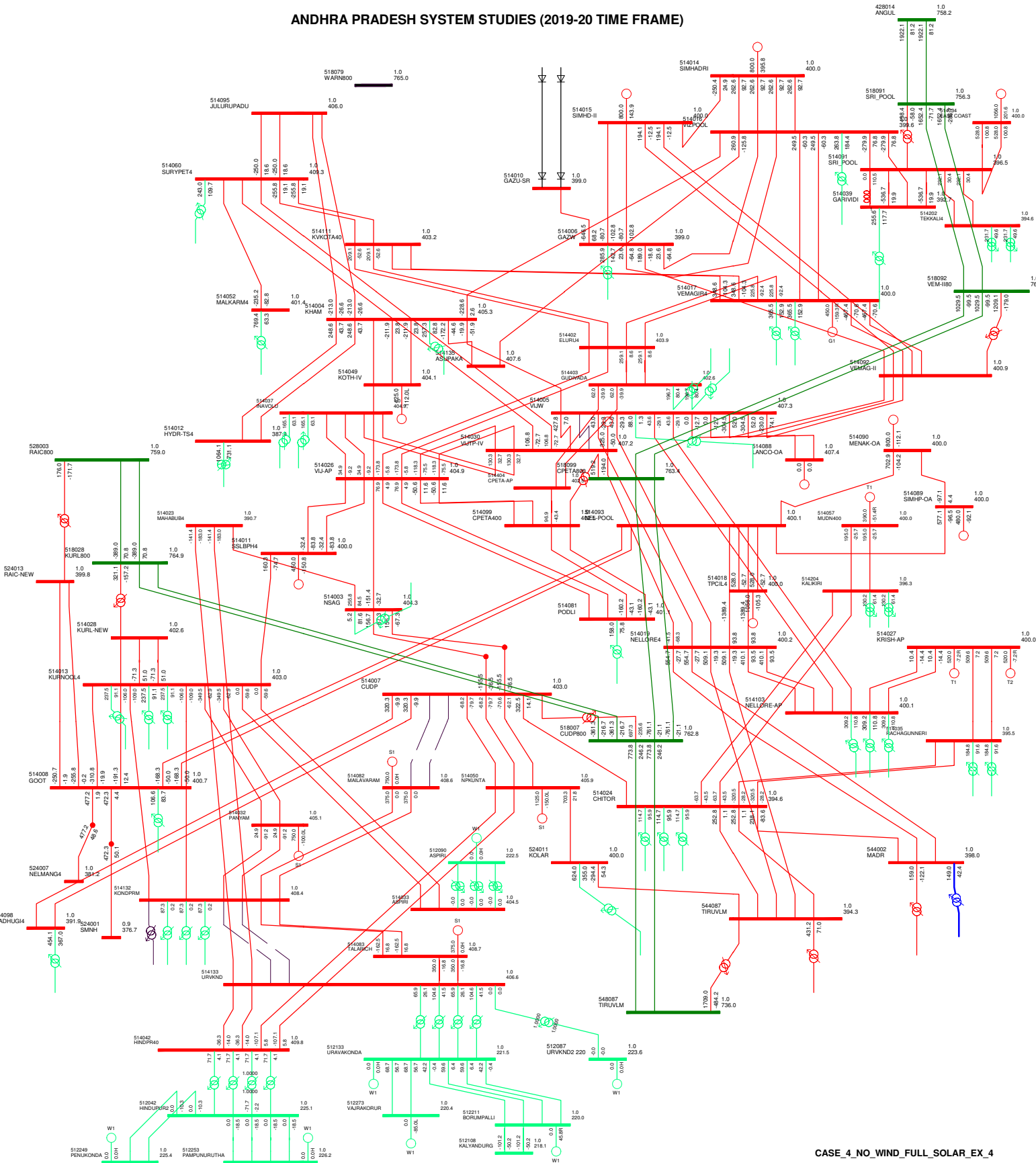
CASE_5_FULL_WIND_NO_SOLAR_EX_5

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



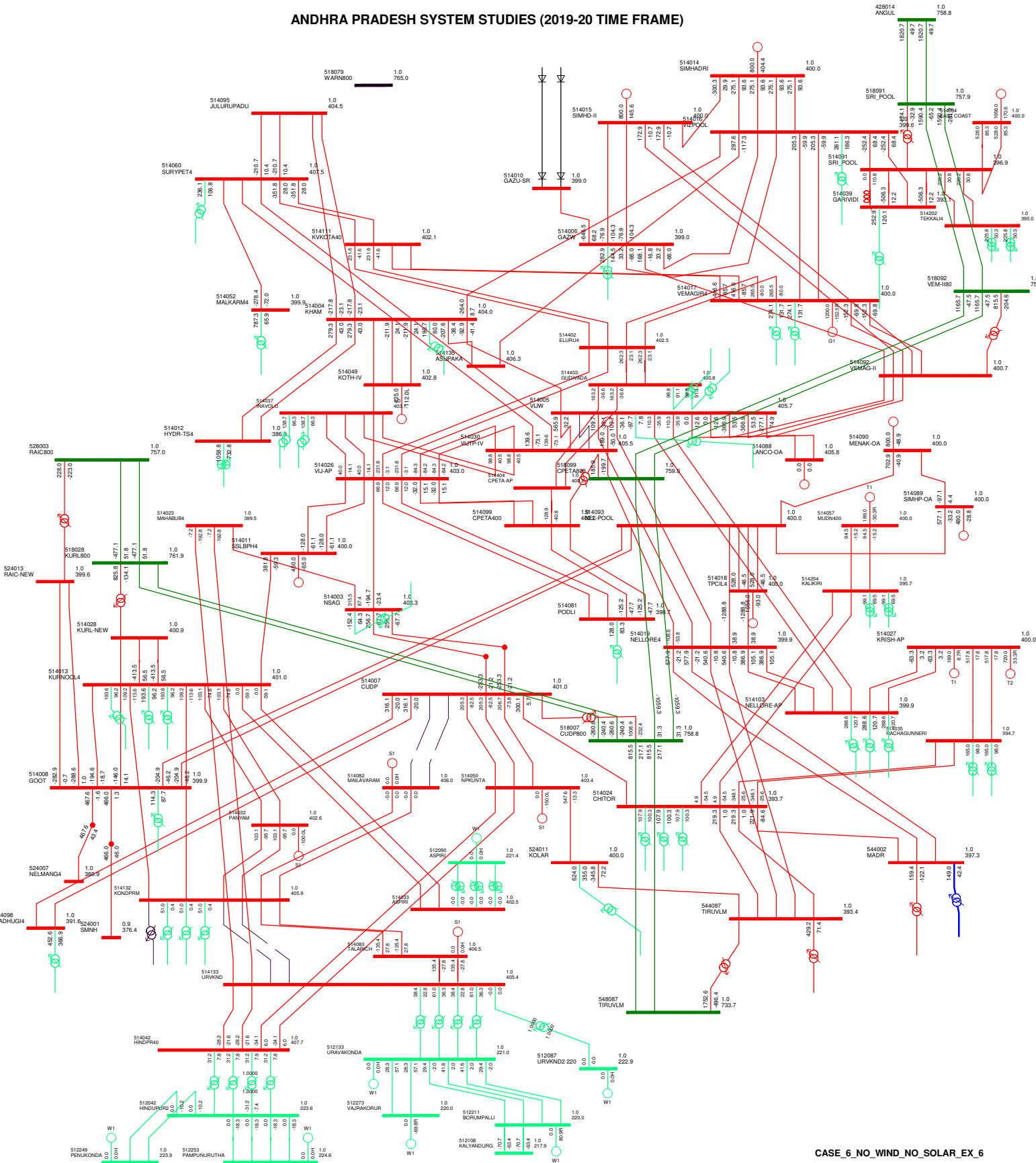
CASE_2_LESS_WIND_FULL_SOLAR_EX_2

ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



CASE_4_NO_WIND_FULL_SOLAR_EX_4

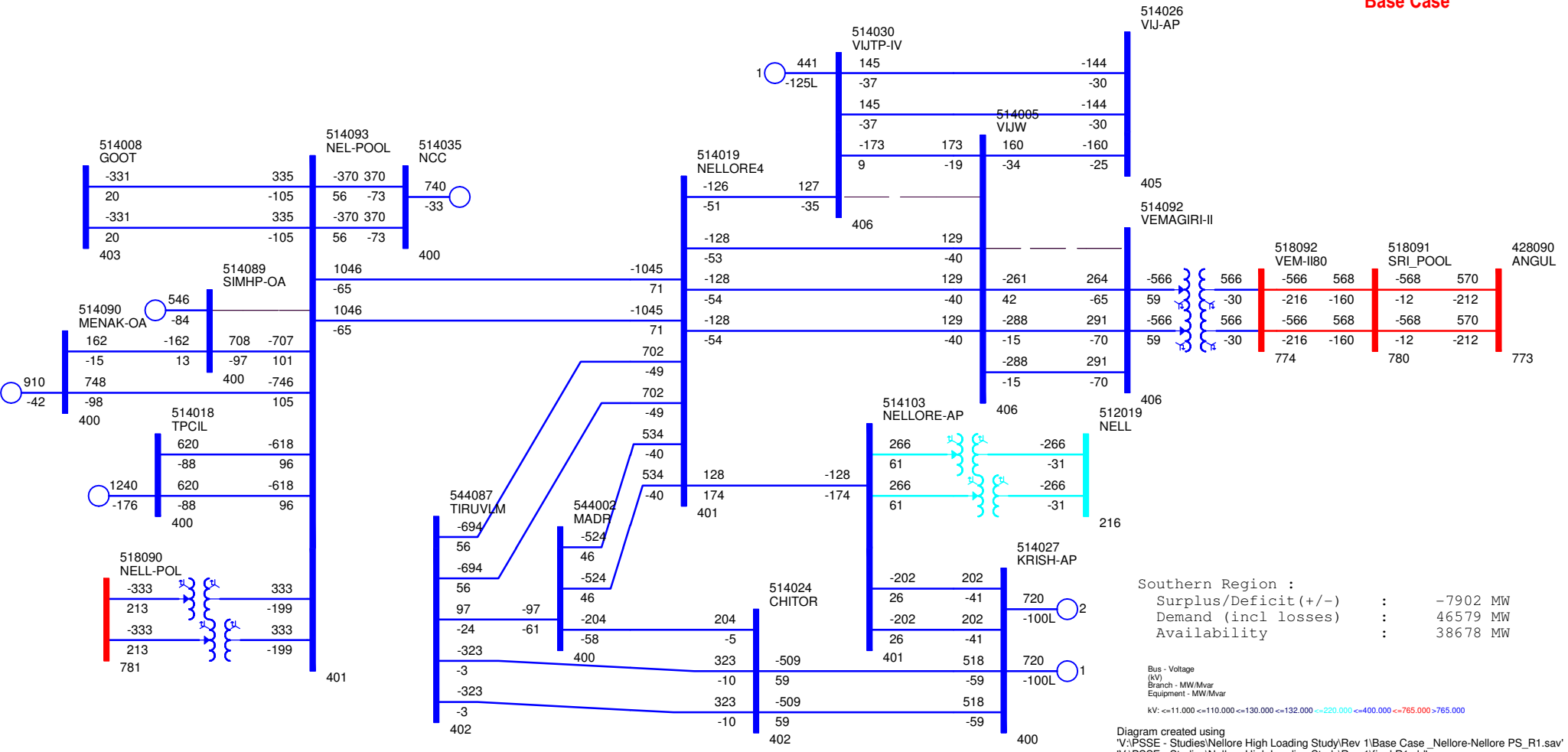
ANDHRA PRADESH SYSTEM STUDIES (2019-20 TIME FRAME)



CASE_6_NO_WIND_NO_SOLAR_EX_6

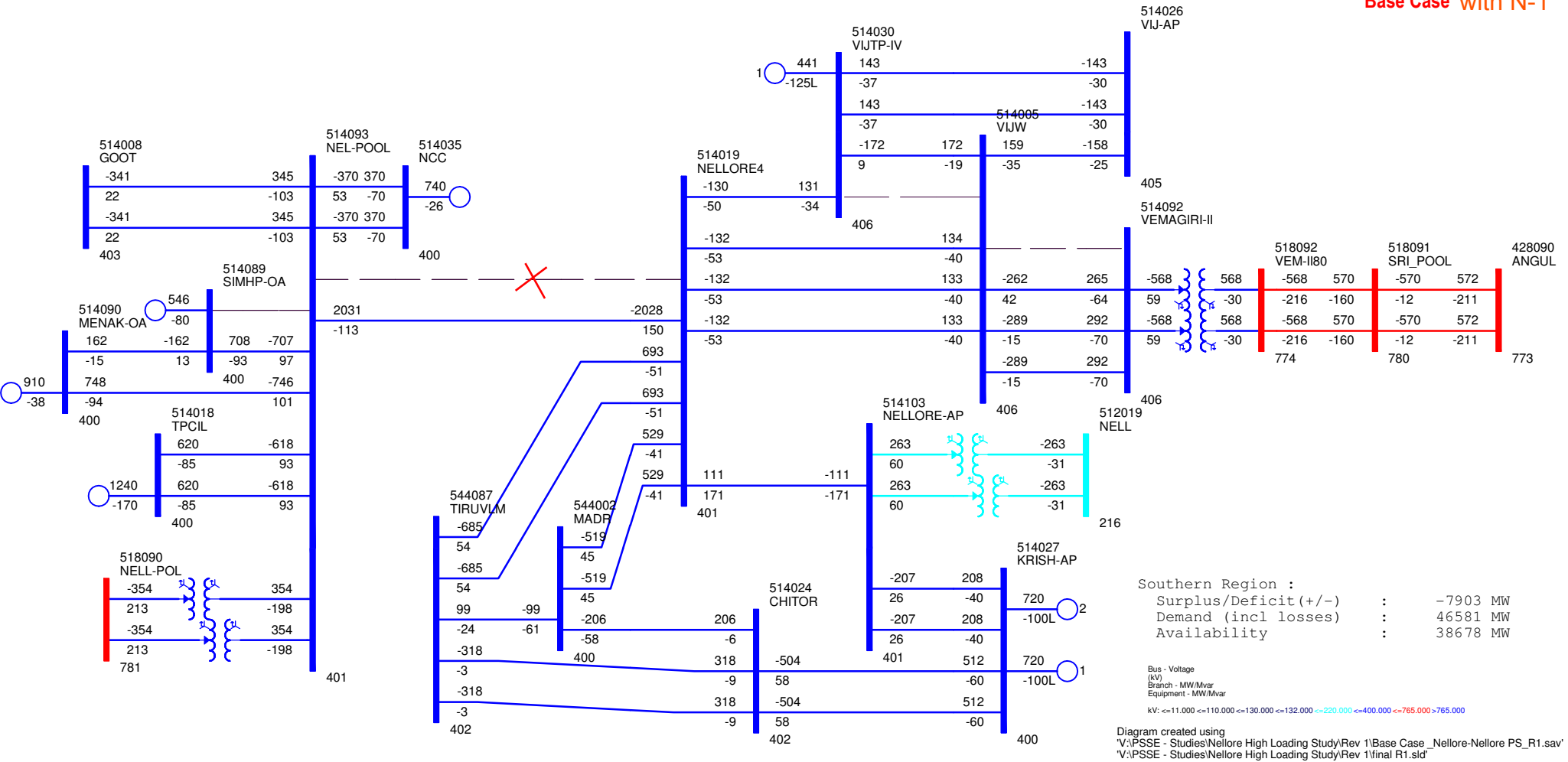
Nellore 765/400kV PS - Nellore (PG) 400kV D/c (Quad) overloading

Base Case



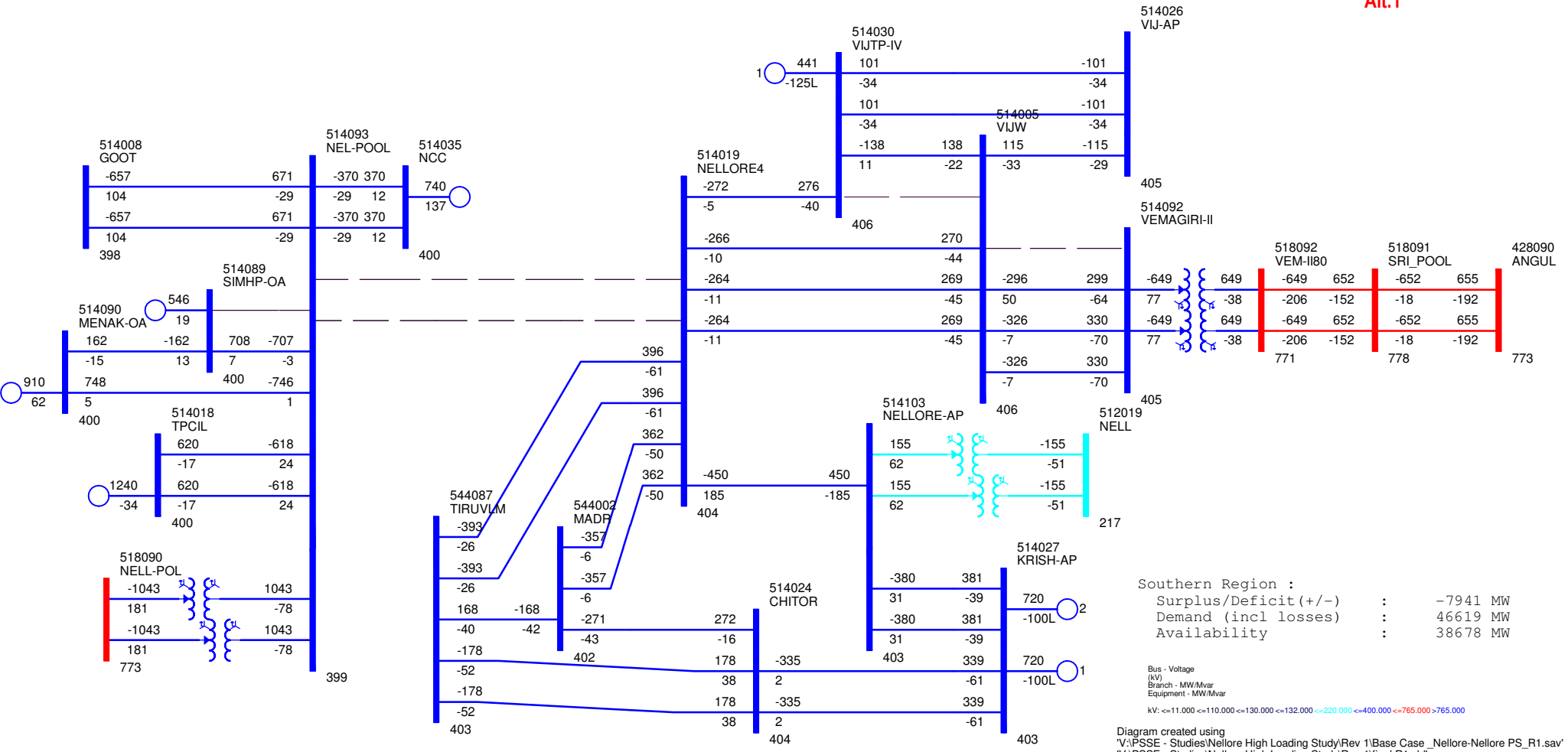
Nellore 765/400kV PS - Nellore (PG) 400kV D/c (Quad) overloading

Base Case with N-1



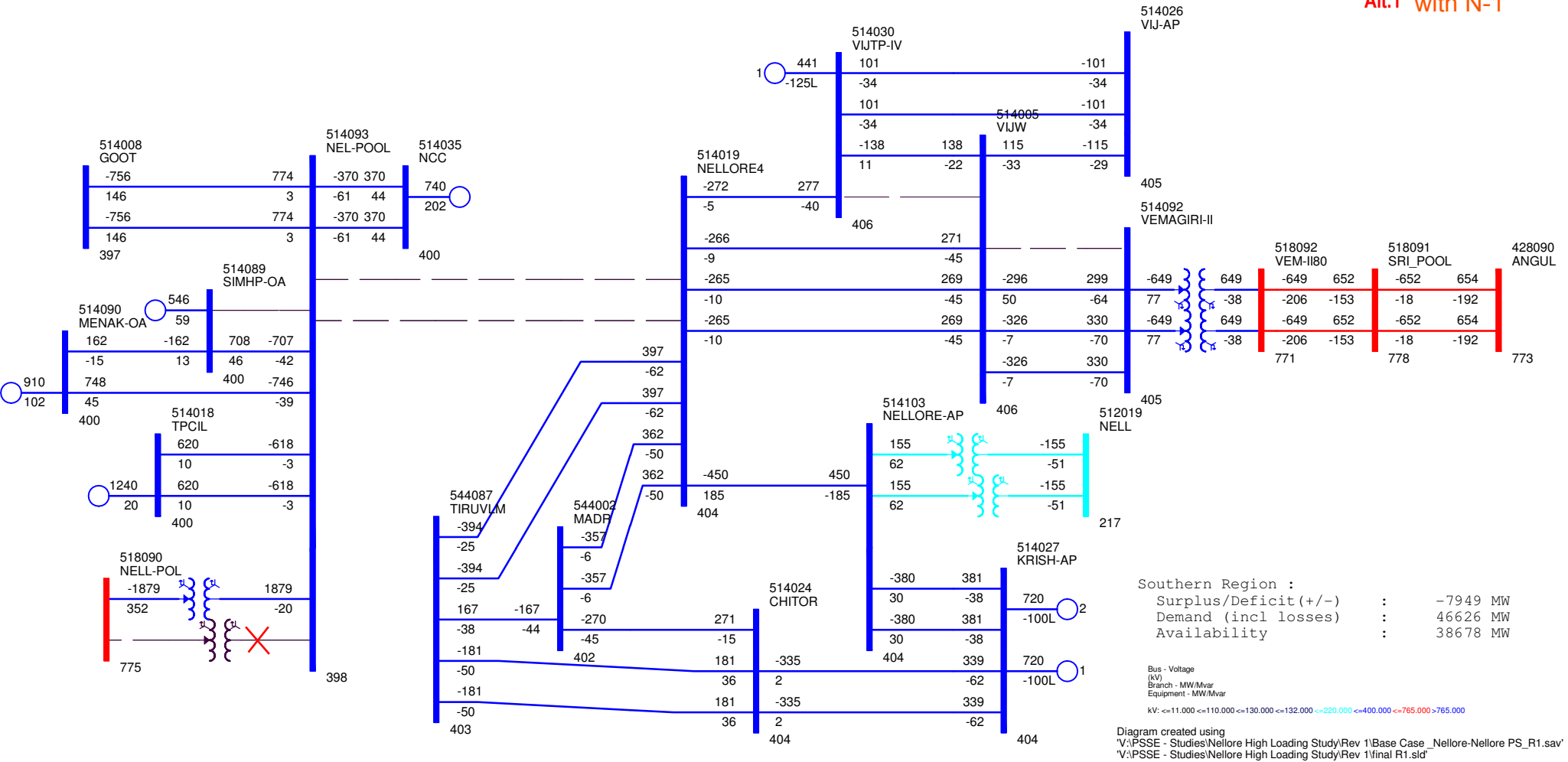
Nellore 765/400kV PS - Nellore (PG) 400kV D/c (Quad) overloading

Alt.1



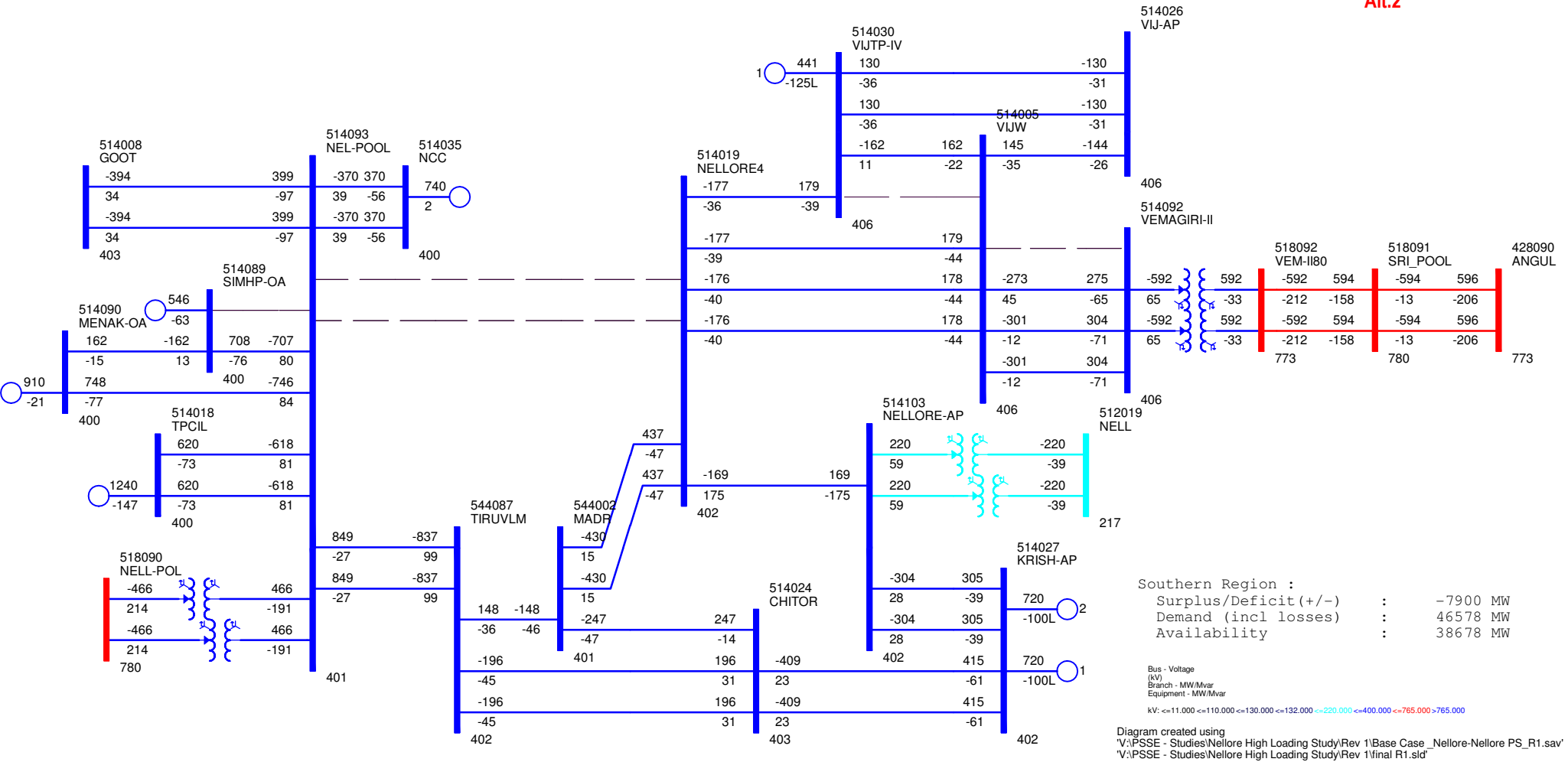
Nellore 765/400kV PS - Nellore (PG) 400kV D/c (Quad) overloading

Alt.1 with N-1



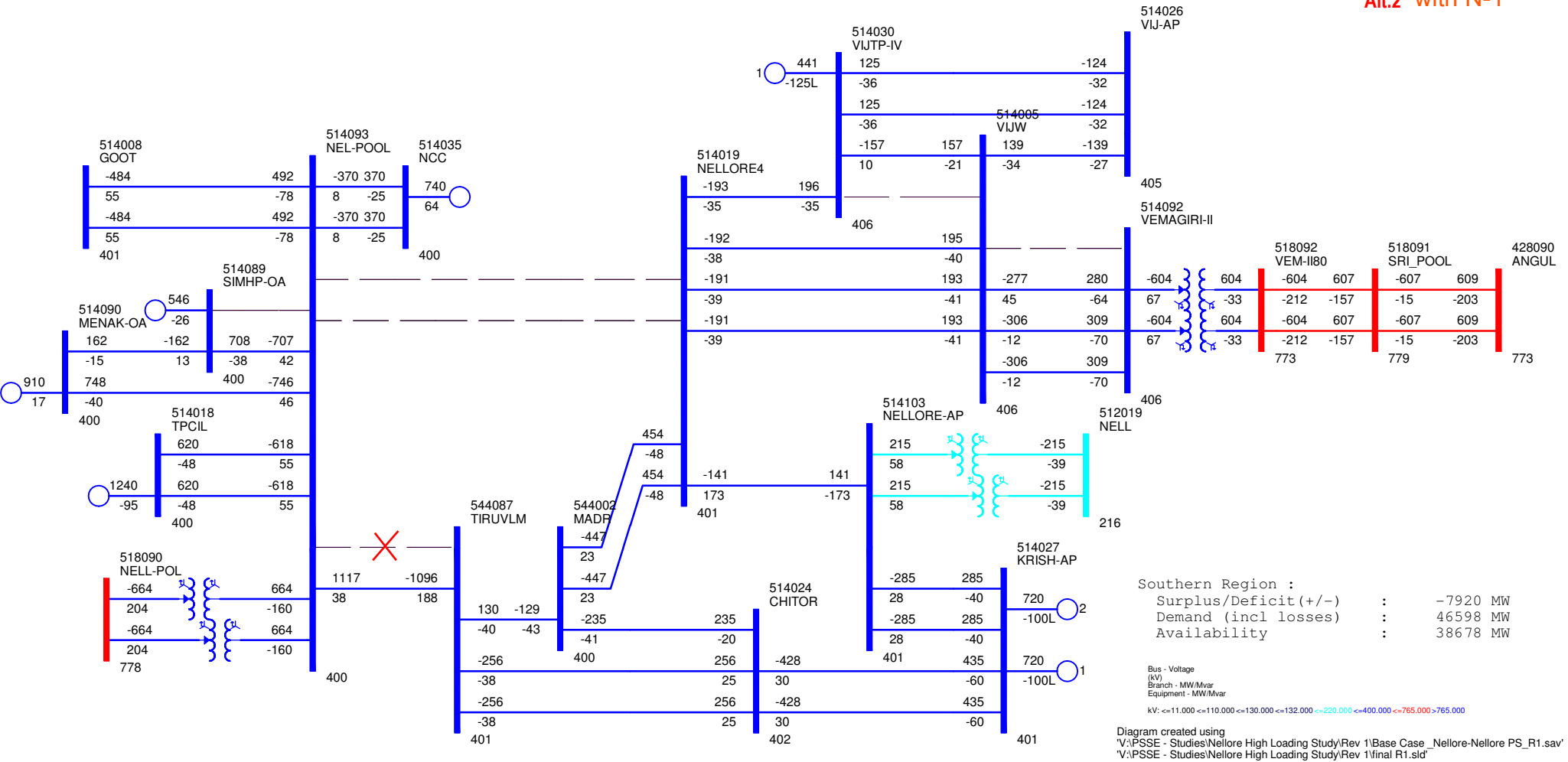
Nellore 765/400kV PS - Nellore (PG) 400kV D/c (Quad) overloading

Alt.2



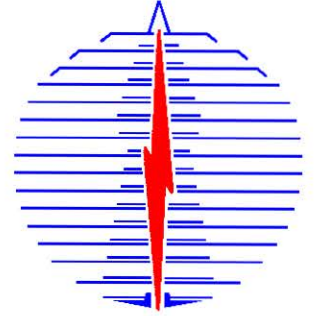
Nellore 765/400kV PS - Nellore (PG) 400kV D/c (Quad) overloading

Alt.2 with N-1



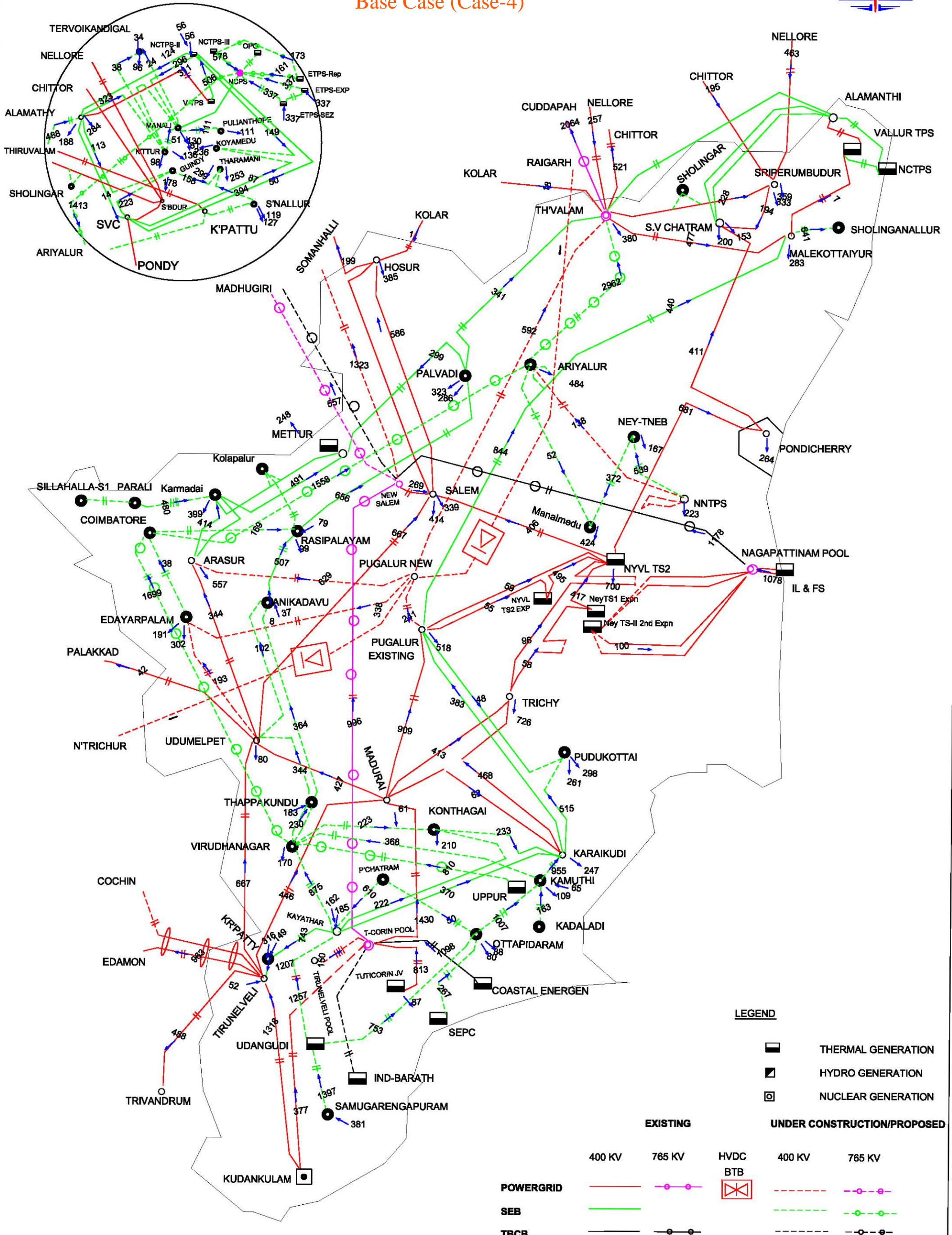
POWER MAP OF TAMIL NADU STATE (765/400 KV LINES)

Annexure-XI/1



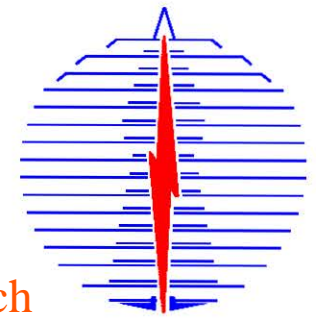
CHENNAI - INSET

Base Case (Case-4)



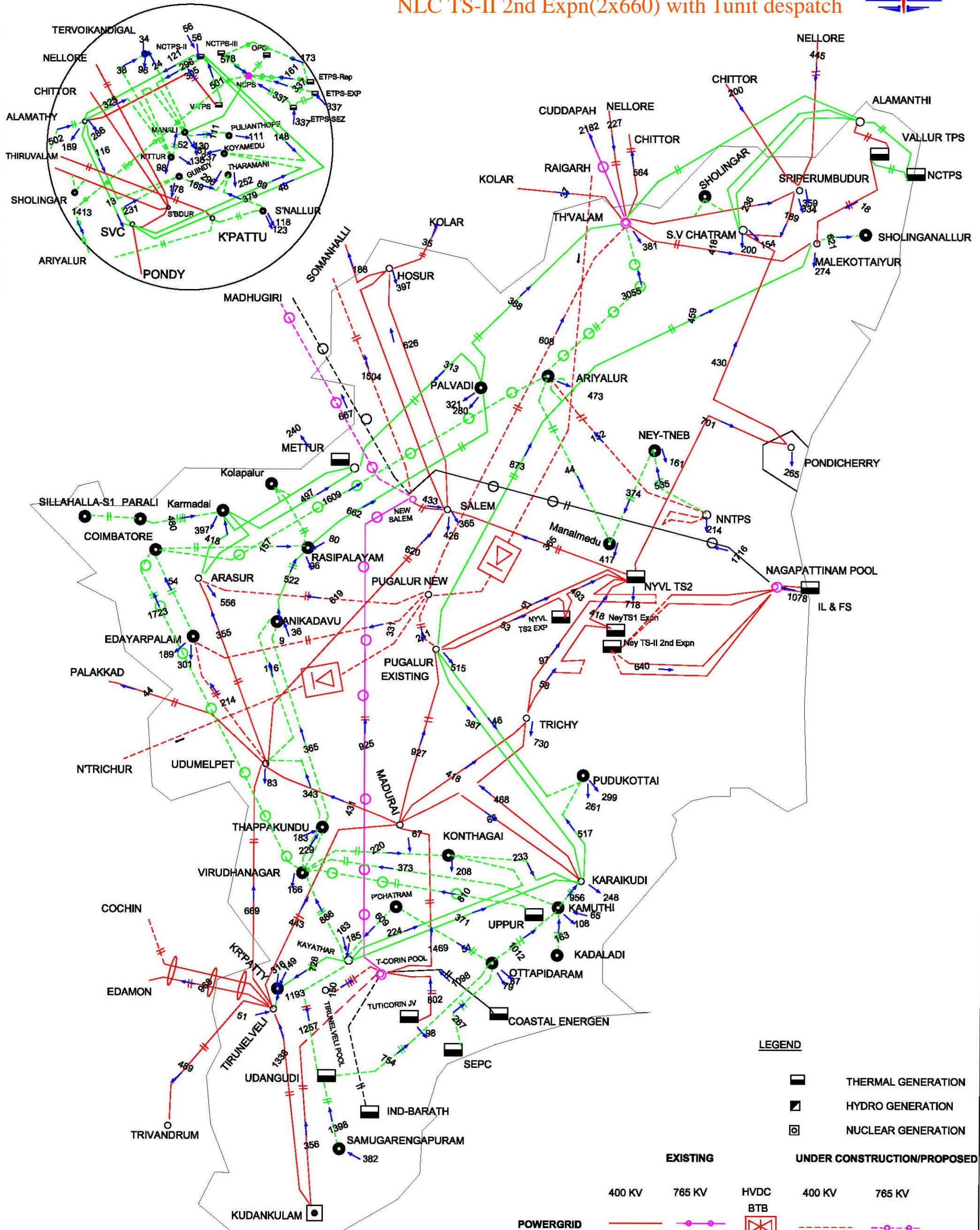
POWER MAP OF TAMIL NADU STATE (765/400 KV LINES)

Agenda for 4th meeting of CFP, P.R. 21.04.2018



CHENNAI - INSET

NLC TS-II 2nd Expn(2x660) with 1unit despatch



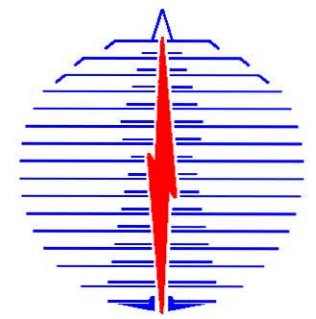
LEGEND

	THERMAL GENERATION
	HYDRO GENERATION
	NUCLEAR GENERATION

EXISTING		UNDER CONSTRUCTION/PROPOSED	
400 KV	765 KV	400 KV	765 KV

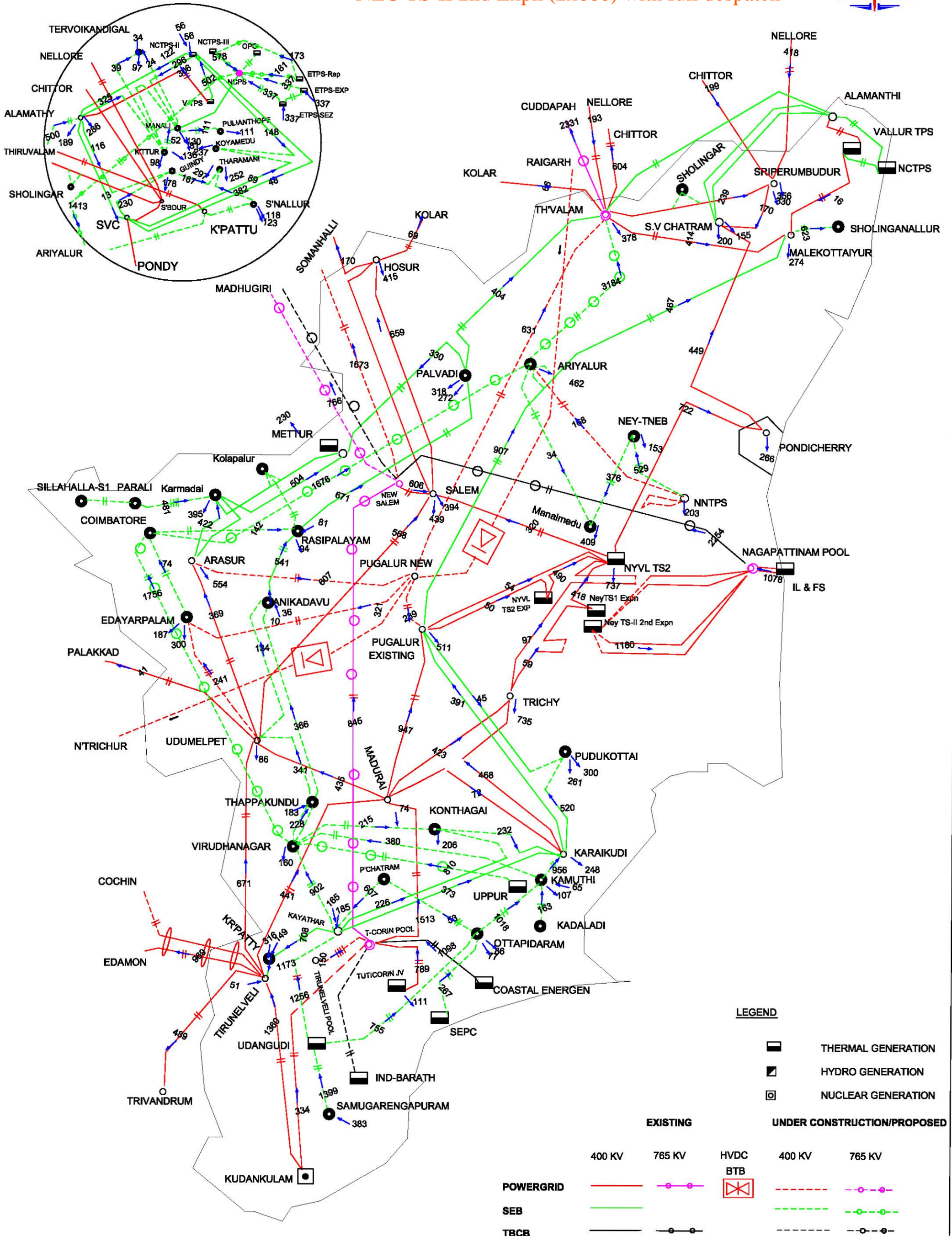
	HVDC BTB
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POWER MAP OF TAMIL NADU STATE (765/400 KV LINES)



CHENNAI - INSET

NLC TS-II 2nd Expn (2x660) with full despatch



LEGEND

- THERMAL GENERATION
- HYDRO GENERATION
- NUCLEAR GENERATION

	EXISTING		UNDER CONSTRUCTION/PROPOSED	
	400 KV	765 KV	400 KV	765 KV
POWERGRID				
SEB				
TBCB				

BTB