ग्रिड-इंडिया
GRID-INDIA

ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
राष्ट्रीय भार प्रेषण केन्द्र / National Load Despatch Centre

कार्यालय : बी-9, प्रथम एवं द्वितीय तल, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली - 110016
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संदर्भ: NLDC/SO/IEGC/Transfer Capability/ **दिनांक:** 28th Aug 2023

सेवा में,

All the Stakeholders

विषय: Stakeholder Consultation and Workshop on Draft Procedure for Assessment of Transfer Capability – Reg.

संदर्भ: Central Electricity Regulatory Commission, Indian Electricity Grid Code, Regulations, 2023

महोदय/महोदया,

In compliance to the regulations of the Central Electricity Regulatory Commission (Indian Electricity Grid Code), Regulations 2023, NLDC, in consultation with RLDCs, has prepared a detailed procedure for **"Transfer Capability Assessment Methodology"**. This procedure is a part of the operating procedure of NLDC & RLDCs prepared in compliance to the IEGC – 2023. The procedure has been published on GRID-INDIA website on **23rd Aug 2023** and is available at: **https://posoco.in/notices/.**

Stakeholder suggestions/feedback on this draft procedure are invited at **nldcreliability@grid-india.in** by **5th September 2023.**

An online workshop on the aforementioned draft procedure will be organized by GRID-INDIA at **1500 hrs** on **31st August 2023** in place of 1030 Hrs as notified earlier**.** Members are requested to join the workshop through the following details:

Microsoft Teams Meeting

Meeting ID: 490 059 670 279
Passcode: 25HRgn

सधन्यवाद,

भवदीय,

(एस. सी. सक्सेना)
कार्यपालक-निदेशक-रा.भा.प्रे.कें.

Copy for kind information:

1. Director – Market Operation/System Operation, GRID-INDIA
2. All RLDC Heads

Grid Controller of India Limited
(Formerly Power System Operation Corporation Limited)
National Load Despatch Centre (NLDC)

Procedure for Transfer Capability Assessment Methodology

Prepared in Compliance

to

Central Electricity Regulatory Commission
IEGC Regulations, 2023

August 2023

Contents

Procedure for Transfer Capability Assessment Methodology

National Load Despatch Centre

1. Background

1.1. This procedure is in accordance with *regulation* 31(2)(d), 33(3)(a), 33(4)(a), 33(5), 33(9), 44(1)(e), 44(1)(f), 44(2)(e), 44(3)(f) of *Central Electricity Regulatory Commission* (Indian Electricity Grid Code) Regulations, 2023.

1.2. As per Central Electricity Regulatory Commission (Connectivity and General Network Access to the inter-State Transmission System) Regulations 2022, Regulation 28.1 states that T-GNA may be applied for any period from 1 (one) time block and up to 11 (eleven) months. Regulation 29.1 of the same regulation states that T-GNA shall be granted within the Available Transfer Capability (ATC) on the ISTS after accounting for the GNA of the GNA grantees.

1.3. As per IEGC 2023 regulation 33 (5) *"RLDC shall assess intra-regional and inter-state level TTC and ATC and submit them to NLDC. NLDC shall declare TTC and ATC for import or export of electricity between regions including simultaneous import or export capability for a region, and cross border interconnections 11 (Eleven) months in advance for each month on a rolling basis."* The study inputs from SLDCs would serve as the foundation for the assessment of transfer capabilities at the interstate, intra-regional levels, interregional and cross-border levels.

1.4. Regulation 33 (3)(a) states that SLDCs shall assess and declare the Total import/export Transfer Capability (TTC) and Available Transfer Capability (ATC) of the state. Further IEGC regulation 44(1)(e)(iii), 44(2)(e), 44(3)(f) mandates that SLDCs, RLDCs and NLDC shall assess TTC/ATC at least three months in advance for their respective control areas.

1.5. Harmonious reading of all the provisions in GNA regulations and IEGC regulations indicates that transfer capability by SLDCs, RLDCs and NLDC shall be assessed and declared *11 (Eleven) months in advance for each month on a rolling basis*.

1.6. The procedure lays down the guidelines for the assessment of TTC and ATC for the import or export of different states/union territories, intra-regional/inter-state level, inter-regional system & cross-border interconnections.

1.7. This procedure is a part of the operating procedure of NLDC & RLDCs prepared as per regulation no. 28(3) and 28(4) of the IEGC – 2023.

2. Scope:

The procedure shall apply to all Users, State Load Despatch Centres (SLDCs), Regional Load Despatch Centres (RLDCs), National Load Despatch Centre (NLDC), Central Transmission Utility (CTU), State Transmission Utilities (STUs), Licensees, and Settlement Nodal Agencies, to the extent applicable.

3. Definitions:

3.1. 'Available Transfer Capability (ATC)' means available power transfer capability across control areas or across regions or between ISTS and state network or between cross-border interconnections declared by the concerned load despatch centre for scheduling transactions in a specific direction with due consideration for the network security. Mathematically, ATC is the Total Transfer Capability Less Transmission Reliability Margin. [CERC IEGC – 2023: Definition – 3(1) (10)]

3.2. 'Bid Area' is defined as the largest geographical area within which market participants are able to exchange energy without capacity allocation.

3.3. 'Congestion' means a situation where the demand for transmission capacity or power flow on any transmission corridor exceeds its Available Transfer Capability [CERC IEGC – 2023: Definition – 3(1) (32)]

3.4. 'Control Area' means an electrical system bounded by interconnections (tie lines), metering and telemetry which controls its generation and/or load to maintain its interchange schedule with other control areas and contributes to regulation of frequency. [CERC IEGC – 2023: Definition – 3(1) (32)]

3.5. 'Credible contingency' means the likely to happen contingency, which would affect the Total Transfer Capability of the inter-control area transmission system [CERC Measures to relieve congestion in real time operation Regulations, 2009 – Definition: 2(1)(f)]

3.6. 'Interconnection Study' means a joint system study to be carried out by LDCs for assessment of the impact of energization of new elements in the grid six months in advance as per the regulations specified in IEGC 2023.

3.7. 'Limiting Constraint' is the limitation on one or more transmission elements that may be reached during normal operation or contingency.

3.8. 'Prolonged outage' means planned or forced shutdown of a transmission element or generator for more than 7 days.

3.9. 'System constraint' is a situation in which there is a need to prepare and activate a remedial action in order to respect operational security limits. [CERC IEGC – 2023: Definition – 3(1) (121)]

3.10. 'Swing bus' means the bus designated in the load-flow study to balance the active power (P) and reactive power (Q) of the system by absorbing/supplying the same.

3.11. "Total Transfer Capability (TTC)" means the amount of electric power that can be transferred reliably over the inter-control area transmission system under a given set of operating conditions

considering the effect of the occurrence of the worst credible contingency. [CERC IEGC – 2023: Definition – 3(1) (128)]. The characteristics of Total Transfer Capability are as follows:

a) TTC is dependent upon the network topology, point and quantum of injection /drawl and power flows in other paths of the interconnected network as well as the prevailing voltage profile in the network during the assessment period.
b) TTC is directional in nature and the transfer capability for the import of power in a region or control area from another region or control area may be different from the transfer capability for the export of power from that region or control area to the other region or control area.
c) Total Transfer Capability is time variant and there could be different figures for different times of the day/month/season/year.
d) Transfer Capability is mentioned in MW.

3.12. "Transmission Reliability Margin (TRM)" means the amount of margin earmarked in the total transfer capability to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions. [CERC IEGC – 2023: Definition – 3(1) (130)]

3.13. 'Unit commitment' means committing generating units while respecting unit operating characteristics as specified in technical regulations laid by CERC or standards given by CEA

Any words mentioned in this procedure and not explicitly defined shall have the meaning assigned to them under the Act or other regulations specified by the Central Commission, or Central Electricity Authority as the case may be.

4. Roles and responsibility and Timeline for Data sharing & TTC/ATC calculation:

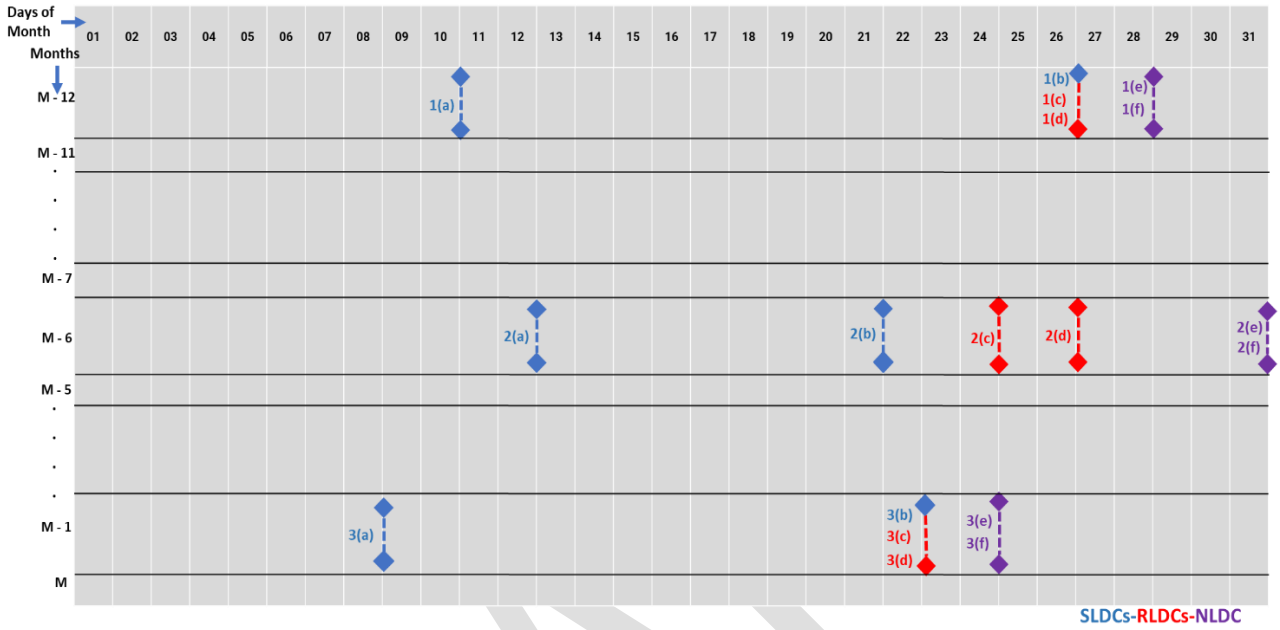
4.1. For calculation of the T-GNA margin eleven months in advance, declaration of TTC needs to be done keeping a clear gap of eleven months. Hence TTC assessment and declaration for month 'M' month shall be done before the end of month 'M-12'.

4.2. Detailed roles and responsibilities for Load despatch centres in various timelines are provided in the table below.

Purpose	Sl No	Action of Stakeholder	Submission Responsibility	Submission to	Data/Information Submission Time line
1. Revision 0 TTC/ATC Declaration for Month 'M'	1(a)	Submission of node wise Load and generation data along with envisaged scenarios for assessment of transfer capability	SLDC	RLDC	10th Day of 'M-12' month
		Assessment of TTC/ATC of the intra-state system and sharing of updated network simulation models			
	1(b)	Declaration of TTC/ATC of the intra-state system in consultation with RLDC			26th Day of 'M-12' month
	1 (c)	Updating state and regional load & generation & modelling of inter-state & intra-state elements in the regional system base case	RLDCs	NLDC	26th Day of 'M-12' month
	1 (d)	Assessment and declaration of TTC/ATC for the intra-regional and interstate system & sharing of network simulation models			
	1 (e)	Update the All-India network model with inputs from RLDCs/SNA	NLDC	RLDCs	28th Day of 'M-12' month
	1(f)	Assessment and declaration of inter-regional and cross-border TTC/ATC on the website			
2. Interconnection Studies for elements to be integrated in the month 'M'	2(a)	Submission of node-wise load and generation data & sharing of network simulation models for intra-state elements coming in the next six months	SLDC	RLDC	8th Day of 'M-6' month
	2(b)	Sharing of inter-connection study results			21st Day of 'M-6' month

Purpose	Sl No	Action of Stakeholder	Submission Responsibility	Submission to	Data/Information Submission Time line
	2(c)	Updating state and regional load & generation & modelling of inter-state & intra-state elements coming in the next six months in the regional system base case	RLDCs	NLDC	13th Day of 'M-6' month
	2(d)	Sharing of inter-connection study results			26th Day of 'M-6' month
	2(e)	Update the All-India network model for interconnection studies	NLDC	RLDCs	15th Day of 'M-6' month
	2(f)	Completion of inter-connection study for elements coming in the next six months			Last Day of 'M-6' month
3. Month Ahead TTC/ATC Declaration & Base case for Operational Studies for Month 'M'	3(a)	Submission of node wise Load and generation data along with envisaged scenarios for assessment of transfer capability	SLDC	RLDC	8th Day of 'M-1' month
		Assessment of TTC/ATC of the intra-state system and sharing of updated network simulation models			
	3(b)	Declaration of TTC/ATC of the intra-state system in consultation with RLDC	SLDC	RLDC	22nd Day of 'M-1' month
	3(c)	Updating state and regional load & generation and modelling of inter-state & intra-state elements in the regional system base case	RLDCs	NLDC	22nd Day of 'M-1' month
	3(d)	Assessment and declaration of TTC/ATC for the intra-regional and interstate system & sharing of network simulation models			
	3(e)	Update the All-India network model with inputs from RLDCs/SNA	NLDC	RLDCs	24th Day of 'M-1' month
	3(f)	Assessment and declaration of inter-regional and cross-border TTC/ATC on the website			

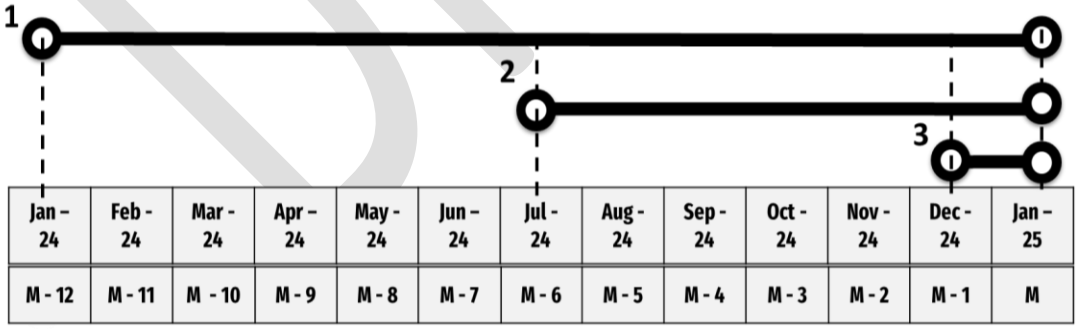
4.3. Timelines for data collection, Base Case Preparation, declaration of TTC/ATC and its review for a typical month 'M' is depicted below. The serial numbers marked for each month in the figure below correspond to the those given against responsibilities of Table in clause 4.2 of this procedure.



4.4. Every month, three sets of different base cases shall be prepared by all the concerned LDCs.

i. Base cases for Revision - 0 TTC/ATC Declaration
ii. Base cases for Interconnection Studies for new elements to be integrated.
iii. Base cases for Month Ahead TTC/ATC Declaration & Operational Studies

The limiting cases used for the assessment of Transfer Capability shall also be shared along with the base cases. The yearly timeline for base case sharing for TTC/Inter-connection study is given below:



Preparation of 3 Sets of Simulation Base-Cases

1. Base cases to be prepared in **Jan 2024** for Revision – 0 TTC/ATC Declaration for **Jan 2025**
(For TTC Declaration)
2. Base cases to be prepared in **July 2024** for 6 Month Ahead Interconnection Studies for elements to be integrated in **January 2025**
(For Interconnection Studies)
3. Base cases to be prepared in **December 2024** for 1 Month Ahead TTC/ATC Declaration & Operational Studies for **January 2025**
(For TTC Declaration and Operational Planning Studies)

5. Methodology for assessment of TTC, TRM and ATC

5.1. The Total Transfer Capability (TTC), Available Transfer Capability (ATC) and Transmission Reliability Margin (TRM) for both import & export shall be computed for all the States/Union Territories (UT), Intra-regional/Inter-state level, Inter-regional system & Cross-border interconnections bid areas. The bid area can also be a part of the Region/State/UT or any combination of the same. The bid area shall be separately defined from time to time as per operational/commercial requirements**.**

5.2. The TTC, ATC and TRM shall be assessed with the help of simulation studies such that all anticipated operating conditions in a particular month are covered. For this, the TTC computation studies may be carried out for at least following four time periods (i.e. considering the load-generation balance of four cardinal points on the monthly load curve or the sum of the absolute value of interregional/regional flow or both depending on the bid area in consideration for TTC assessment) of a typical day of the month.

a) Solar Peak Period

b) Non-Solar Peak Period

c) Non-Solar Off-peak Period

d) Morning Peak Demand Period

If required, further granular resolution i.e. hourly, sub-hourly (15 min.) may also be considered for TTC assessment and declaration. This shall be in line with IEGC regulation 31(2)(d) under Operational planning.

5.3. Separate limiting cases for computing the export and import capability corresponding to preferably four load-generation scenarios (as specified in point 5.2 above) for the time frame for which transfer capability is to be assessed shall be used in the simulation studies. If additional study cases, apart from the ones prepared for 04 time periods are prepared, then the same shall also be shared by the concerned SLDC with concerned RLDCs and vice-versa.

5.4. **Modelling of Power System:** The TTC assessment simulation studies will require setting up of a power system model and obtaining a power flow solution. The construction of an accurate base case simulation model is of utmost importance for the accurate assessment of TTC. The modelling and input data guidelines to be followed for TTC assessment are as under:

5.4.1 EHV transmission network shall be normally modelled down to at least 110 kV level with exceptions for generating units connected at lower voltage levels.

5.4.2 Normally, all the conventional generating units greater than 50 MW and connected at 110 kV and above shall be modelled. Smaller generating units (particularly hydro) may be lumped for study purposes.

5.4.3 For Renewable Energy (solar, wind, solar-wind hybrid) and Battery Energy Storage plants, equivalent

modelling at a voltage level not less than 33 kV shall be considered explicitly.

5.4.4 Modelling data shall be shared by CTU, ISTS licensees, ISGS/IPPs, STUs/SLDCs and all other Users for carrying out interconnection studies. The models need to be submitted as per the formats prescribed in GRID-INDIA/NLDC's procedure for "*First Time Charging/Energization (FTC) and Integration of New or Modified Power System Element*".

5.4.5 New transmission elements shall be considered only after the date of commissioning of that asset and duly considering their reliability during the initial operation period.

5.4.6 Whenever a new element is commissioned, depending on the jurisdiction of SLDC/RLDC/NLDC, the concerned LDC may add it to the network and a file for the same may be created and maintained. The automation file (such as Python scripts) will be shared with all other concerned LDCs.

5.4.7 The equipment ratings and models submitted by the users at the time of first-time charging/inter-connection study (or revised models submitted later) shall be considered in the assessment of transfer capability. In case any clarification is required regarding the model/rating of any equipment during transfer capability studies, the same shall be sought from the asset owner/user. The ratings of equipment will also be reviewed based on operational permissible loading and dynamic rating of the equipment from time to time.

5.4.8 Load shall be generally lumped at 110/132 kV, as the case may be. Actual system data wherever available shall be used for power system modelling. In cases, where data is not available, standard data as given in the CEA Manual on Transmission Planning Criteria shall be considered. The different components of load as constant power, constant current and constant impedance should be modelled as per the information available from users. In the absence of the above information load should be modelled as constant power load.

5.5 **Load Set – Point**

5.5.1 For the 1st time to build the All-India Base case in this format SLDC/RLDC may submit node-wise data as per *format-2* given at the end of this procedure. For the subsequent base-case preparation and simulation studies, the data shall be provided in the base-case itself or as per requirement.

5.5.2 Nodal MW demand shall be considered as per the node-wise load forecast provided by SLDCs. Independent load forecasts by RLDCs/NLDC shall be considered in case of the absence of SLDC data. For all four scenarios as mentioned above, node-wise demand must be updated. For overall demand estimation, LGBR finalized by RPC and the latest EPS data may be taken into consideration.

5.5.3 Nodal MVAR demand shall be as per the anticipated power factor provided by SLDCs or power factors as observed from the historical data for each node. This, however, shall be verified, post facto, with actual data, and if different, shall be revised for accurate assessment in the future. For

all the four scenarios mentioned above node wise reactive power demand must be updated.

5.5.4 Bulk consumer connected to ISTS/ having dual connectivity shall explicitly submit their net active and reactive power consumption/injection for all the four scenarios to the respective RLDC.

5.6 **Network Topology to be Considered for Base Case Preparation:**

5.6.1 Outage plan for grid elements as finalized by RPC shall be considered during base case preparation for assessment of Transfer Capability. In case the same is not available, information available from respective utilities shall be considered.

5.6.2 Updated network topology shall be prepared by SLDCs/RLDCs/NLDC as per prevailing network configuration. If the updated network topology is not received from respective agencies, network details as available previously shall be used for TTC computation studies.

5.6.3 The transmission elements/generators under prolonged outage shall be not considered in the simulation cases for assessment of Transfer Capability. The same shall be switched on in the simulation cases for assessment of Transfer Capability only after their revival.

5.7 **Unit Commitment and Active Power Generation Dispatch:**

5.7.1 The unit commitment (on-bar units) and source-wise dispatch in the base case shall be considered as per the output of Short-Term Resource Adequacy/Production Cost Modelling Studies carried out by states/ RLDCs/NLDC. In the absence of such information, LGBR and annual generation outage plan published by RPCs in line with IEGC regulation 32(3)(b) may be considered along with the following source-wise dispatch methodology.

a) **Nuclear dispatch** shall be considered as per the past trend of Plant Load Factor available with Central Electricity Authority (CEA) or SLDCs/RLDCs/NLDC while suitably factoring in the maintenance schedule finalized by Regional Power Committees (RPCs).

b) **Solar and wind dispatch** shall be considered based on the historical dispatch factors available with SLDCs/RLDCs/NLDC corresponding to each study scenario. For newer plants, either the profile data available as specified in CEA's Manual on Transmission Planning Criteria or historical dispatch of nearby existing plants may be considered.

c) **Hydro dispatch** shall be considered as per the past trend available at SLDCs/ RLDCs/NLDC. The current inflow pattern shall also be suitably considered in the studies.

d) **Gas Dispatch** shall be considered as per the past trend of Plant Load Factor available with Central Electricity Authority (CEA) or SLDCs/RLDCs/NLDC while suitably factoring in the maintenance schedule finalized by Regional Power Committees (RPCs).

e) **Coal-fired thermal dispatch for** the state/regional/control area/bid area may be arrived at after deducting the anticipated generation of other sources from the total anticipated

generation requirement. While deciding the distribution of thermal generation, the merit order dispatch of thermal generators shall be considered.

Further, the generation shall be considered as per the anticipated ex-bus generation of the thermal generating units arrived after deducting a normative auxiliary consumption as per the norms specified by Central Commission and suitably factoring in the maintenance schedule finalized by Regional Power Committees (RPCs). Distribution of thermal dispatch between state sector generators and ISGS shall be decided in consultation with states/past trends over and above merit order dispatch.

f) Injection/Drawl value of cross-border connection will be set as per historic pattern. Apart from the historic pattern, data received from SNA/DA for additional contracts for all four scenarios shall also be considered.

g) In case, the data from any of the sources mentioned above is unavailable or in case of additional data requirement, reasonable assumptions shall be made.

5.8 **Reactive power dispatch**:

5.8.1 For generating units, reactive power dispatch shall be considered as per the declared generator capability curve or demonstrated generator capability curve from the historical data. In the absence of such data, assumptions recommended in the extant CEA's Manual on Transmission Planning Criteria may be taken. The MVAR absorption of the Generator transformer (GT) shall be considered for implicitly modelled GTs.

5.8.2 The reactive power reserves of FACTS devices in the base case under steady-state shall be preserved to the extent possible so as to provide maximum dynamic support.

5.8.3 In the case of LCC HVDC links, the switching of HVDC Filter banks shall be done in the base case as per the filter switching sequence of the converter station depending on the HVDC power order.

5.9 For arriving at the Total Transfer Capability value of a control area/bid area, load and generation shall be changed for both importing and exporting areas in the base cases (incremental dispatch) as per the following methodology.

5.9.1 **Import Transfer Capability**: While calculating the import transfer capability of a control/bid area, the load of the control/bid-area shall be kept considering the peak demand scenario. Then the generation of the importing area(s) may be backed down as per reverse merit order for conventional generators except for nuclear and hydro plants & commensurate generation outside the area shall be increased. This process shall be continued till a credible N-1 contingency causes some limiting constraint in the importing/exporting area or joining both areas.

5.9.2 **Export Transfer Capability:** While calculating the export transfer capability of a control/bid area, the load of the control/bid-area shall be kept considering the off-peak demand scenario. Then the

generation of the exporting area(s) shall be increased as per merit order except for nuclear and hydro plants and a commensurate increase in demand will be done outside the area. This process shall be continued till a credible N-1 contingency causes some limiting constraint in the importing/exporting area or joining both areas.

5.10 Following points shall be considered while assessing the import & export transfer capability

5.10.1 Reserve requirements/technical minimum should be honoured during scaling up/down of generation

5.10.2 The dispatch of swing bus generators in the load flow solution results shall be within their technical maximum/minimum limits.

5.10.3 The swing bus in the load flow studies shall be located outside the importing/exporting area in the transfer capability assessment.

5.11 The credible N-1 contingencies considered in the TTC/ATC studies shall be as specified in the latest CEA Manual on Transmission Planning Criteria.

5.12 In the studies, the worst credible contingency shall be considered to ensure the following limits:

a) Equipment Loading (Thermal or any other operational Limit)

b) Voltage Stability

c) Transient Stability

5.13 During assessment of Total Transfer Capability, it shall be ensured that the Reliability Criteria specified for N-1 and N-1-1 contingencies in the latest CEA Manual on Transmission Planning Criteria are satisfied.

5.14 Power Order and direction of the HVDC links shall be based on the envisaged scenarios and capability of the HVDC link. The same may also be modulated in the base-case for the particular scenario based on the power flow in AC lines/ICTs & bus voltages.

5.15 The Transmission Reliability Margin (TRM) shall be kept within the total transfer capability to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in the system conditions. Computation of TRM for a region or control area or group of control areas may be based on the consideration of the following:

5.15.1 Size of largest generating unit in the importing control or bid area/group of control or bid areas

5.15.2 Two percent (2%) of the total anticipated peak demand met in MW of the control/bid area/group of control or bid areas (to account for forecasting uncertainties).

Provided that either of the above TRM value may be decided by the concerned LDC to ensure the

reliability of the system under prevailing system conditions.

6. Declaration of TTC, TRM, ATC and Anticipated Constraints

6.1. The State Load Despatch Centres (SLDCs), in consultation with Regional Load Despatch Centres (RLDCs) shall assess & declare the Transfer Capability for the import or export of electricity by the State.

6.2. The Regional Load Despatch Centres (RLDCs), in consultation with State Load Despatch Centres (SLDCs) & National Load Despatch Centre (NLDC) shall assess & declare the Transfer Capability for intra-regional and inter-state level.

6.3. The National Load Despatch Centre (NLDC) shall assess & declare the Transfer Capability for inter-regional systems and cross-border interconnections.

6.4. SLDCs/RLDCs/NLDC shall declare the assessed Transfer Capability for both export and import scenarios on their website with the following information

a) Total Transfer Capability (TTC)
b) Available Transfer Capability (ATC),
c) Transmission Reliability Margin (TRM),
d) Limiting constraints and limiting elements
e) Assumptions in the base case for assessment of Transfer Capability,
f) Details of the reason for the revision of the Transfer Capability

6.5. The National Load Despatch Centre (NLDC), Regional Load Despatch Centres (RLDCs) and State Load Despatch Centre (SLDCs) shall refer to the quantum declared by CTUIL while assessing the TTC, TRM and ATC for the purpose of grant of GNA.

Sample format for declaration of TTC/TRM/ATC is enclosed as **Format-I**.

6.6. NLDC and/or concerned RLDCs/SLDCs in consultation with each other may revise the TTC, ATC and TRM of respective areas due to changes in system conditions, which includes changes in network topology or change in anticipated active or reactive generation or load, on account of outage or otherwise, of one or more generators or transmission elements, at any of the nodes in the study. Revised TTC, TRM and, ATC shall be published on the website of NLDC, concerned RLDCs and SLDCs and shall clearly state the reasons for revision thereof.

6.7. The TTC, ATC and TRM may also be revised near the operating horizon depending on the anticipated system conditions at that time.

6.8. SLDCs / RLDCs / and NLDC shall designate Main and Alternate officers as *"Reliability co-coordinator(s) for TTC Computation and Declaration".*

7. Study of impact of new elements on TTC Transfer Capability

7.1. Each LDC shall study the impact of new elements on the Transfer Capability as per the relevant regulations of IEGC 2023 (IEGC Operating Code: Regulation 33(9) to 33(13)) for interconnection study for new power system elements.

7.1.1. Each SLDC shall undertake a study on the impact of new elements to be commissioned in the intra-state system in the next six (6) months on the TTC and ATC for the State and share the results of the studies with RLDC.

7.1.2. Each RLDC shall undertake a study on the impact of new elements to be commissioned in the next six (6) months in (a) the ISTS of the region and (b) the intrastate system on the inter-state system and share the results of the studies with NLDC.

7.1.3. NLDC shall undertake study on the impact of new elements to be commissioned in the next six (6) months in (a) inter-regional system, (b) cross-border link and (c) intraregional system on the inter-regional system.

7.2. Timelines and methodology of the interconnection studies are to be followed as per "Procedure for Carrying Out Interconnection Studies of New Power System Elements" notified by NLDC.

7.3. Any major impact on TTC figure by the commissioning of a new element needs to be notified to the concerned utilities

8. Revision of Procedure

As and when required, the procedure shall be reviewed and revised by GRID-INDIA/NLDC with prior approval of the Commission

Format-I

National /_____ Regional/ _____ State Load Dispatch Centre

TOTAL TRANSFER CAPABILITY FOR MMM, YYYY

Issue Date: **Issue Time:** **Revision No.**

Corridor/ Control Area	Date	Time Period	Time Blocks	Total Transfer Capability (TTC) (MW)	Reliability Margin (RM) (MW)	Available Transfer Capability (ATC) (MW)	Approved GNA (MW)	Margin for T- GNA (MW)	Changes in TTC w.r.t last revision	Remarks
		Period-1								
		Period-2								
		Period-3								
		Period-4								

Assumptions:

A. Aggregate Load and Generation (MW)

Region/State/Bid-Area		Scenarios			
		Solar Peak	Non-Solar Peak	Non-solar Off-Peak	Morning Peak
	Load				
	Generation				

B. HVDC Settings

Name of the HVDC Link	Direction of Operation	Power Order (MW)

C. Constraints

Corridor / Control Area	Limiting Constraints for TTC

D. Revision History

Revision Number	Date of Revision	Reason for Revision	Corridors Involved

E. Miscellaneous

Note: The format is not explicit and may be changed suitably based on the requirement to accommodate all the necessary data with approval of the commission.

Format-II (Node Wise Load Details)

Bus Number	Bus Name	S/s name	In Service	Morning Peak		Solar Peak		Evening Peak		Off-Peak	
				Pload (MW)	Qload (Mvar)	Pload (MW)	Qload (Mvar)	Pload (MW)	Qload (Mvar)	Pload (MW)	Qload (Mvar)

Note: The format is not explicit and may be changed suitably based on the requirement to accommodate all the necessary data with approval of the commission.