

Stakeholder Workshop

Procedure for Transfer Capability Assessment Methodology



31st August 2023

Grid Controller of India Ltd.
(erstwhile POSOCO)

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Background

This procedure is in accordance with regulation 31(2)(d), 33(3)(a), 33(4)(a), 33(5), 33(9), 33(10), 33(11), 44(1)(e), 44(1)(f), 44(2)(e), 44(3)(f) of Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023.

It is a part of the operating procedure of NLDC & RLDCs prepared in compliance to IEGC 2023.

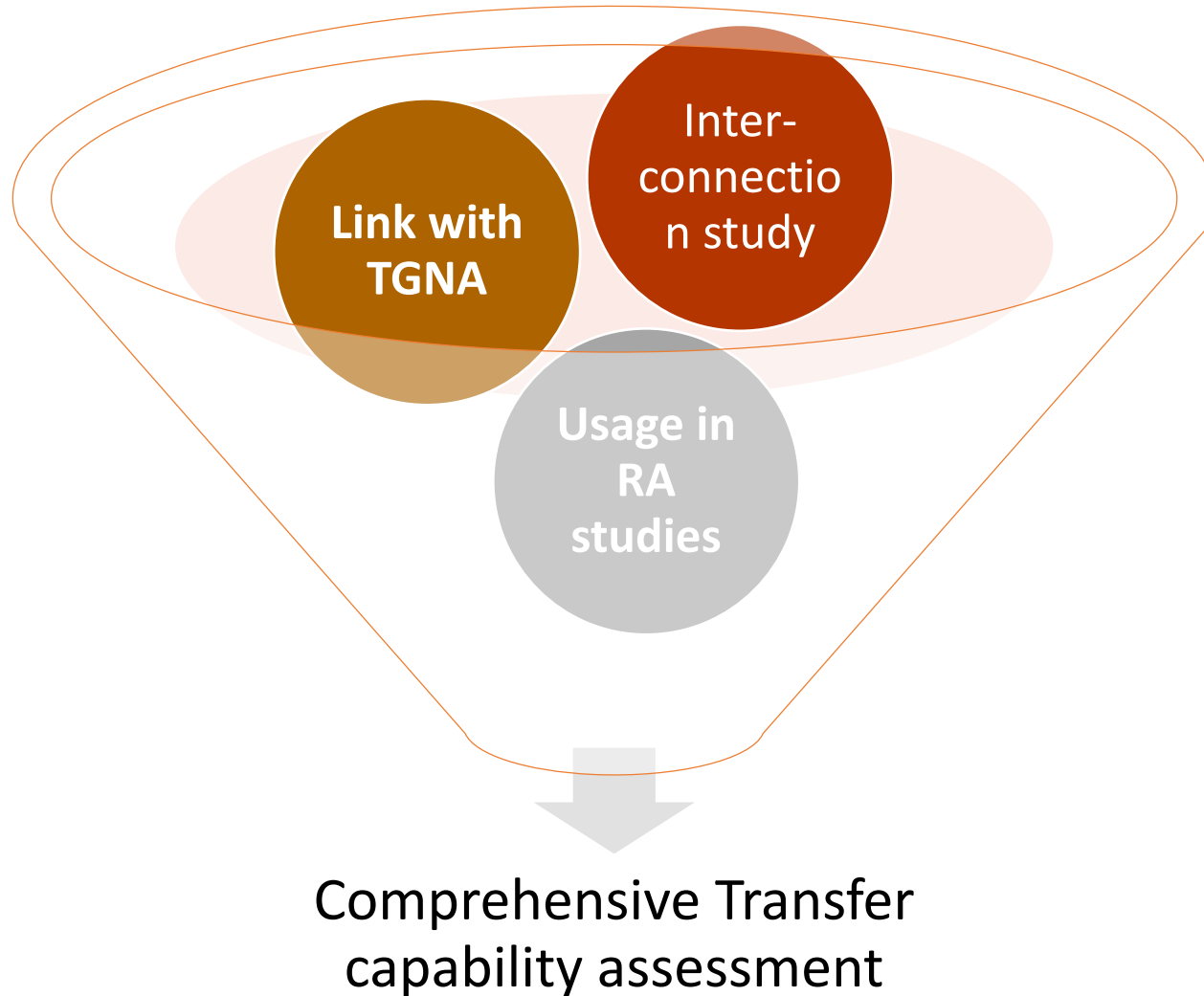
This procedure also ensure harmonization between the provisions of GNA regulations and IEGC regulations.

This procedure lays down the **guidelines for data submission and 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.**

Motivation

- ❖ Safe and secure operation of Power Market
- ❖ Assessment of margin for T-GNA
- ❖ Assessment of safe operating limits of transfer of power across various corridors.
- ❖ Usage on performing interconnection studies
- ❖ Pave the path for cross border power exchange by assessing the safe limit of operation of international interconnections.
- ❖ Transfer capability assessment has relevance on Resource adequacy studies

Major changes in TTC/ATC assessment procedure



Present procedure of **3 month** ahead assessment will be revised by **11 month ahead** assessment

Interconnection study

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 IEGC 2023 regulations.

Shall provide sufficient time for assessing the grid conditions under new elements

Any system constraint due to delayed/part/complete implementation of a transmission/generation system can be identified much ahead of the real-time constraints.

Any interim/ permanent measures to facilitate the first-time energization of the power system elements can be explored

Concept of Bid area

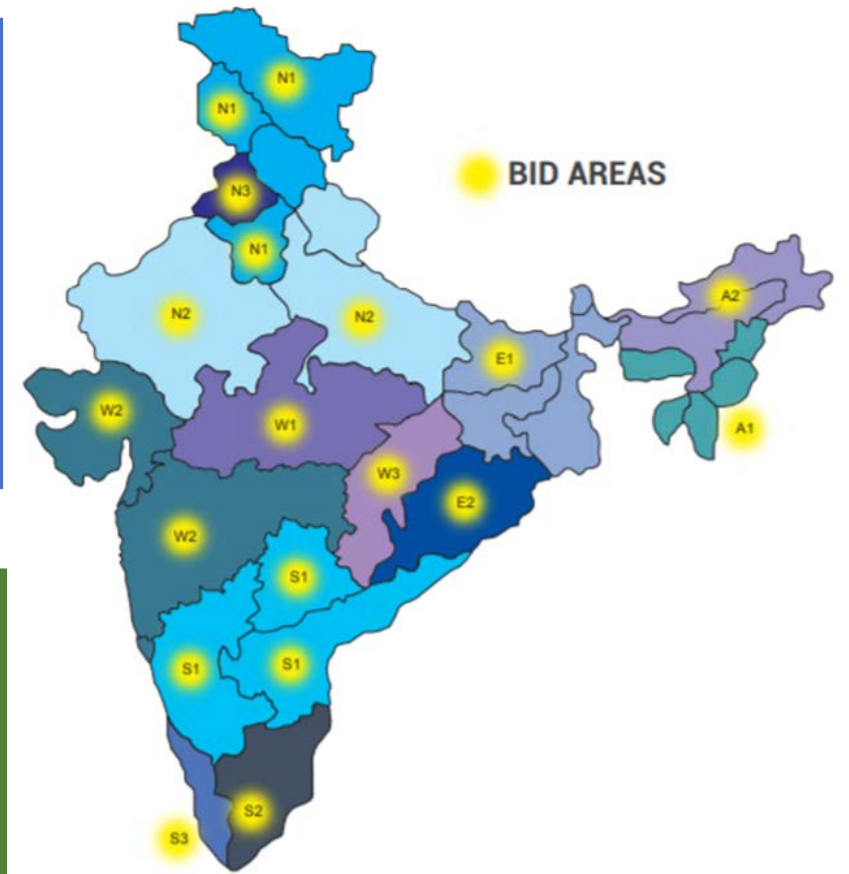
Bid Area: Largest geographical area within which market participants are able to exchange energy without capacity allocation.

Power exchange to keep the provision to configure each state as bid areas.

All state shall be configured as bid areas. Additional bid areas/group of bid areas may also be configured upon intimation by NLDC

Before granting GNA, CTU shall assess and declare transfer capability, available transfer capability, Transmission reliability margin of:
Region , Intra-region/group of bid or control area , Individual bid/control area

CTU shall provide interface for communicating approved GNA quantum to NLDC



Jurisdiction of Transfer capability assessment

a) SLDC :

Shall assess and declare TTC/ATC & TRM for intra state system and export and import capabilities of state in total in consultation with RLDCs.

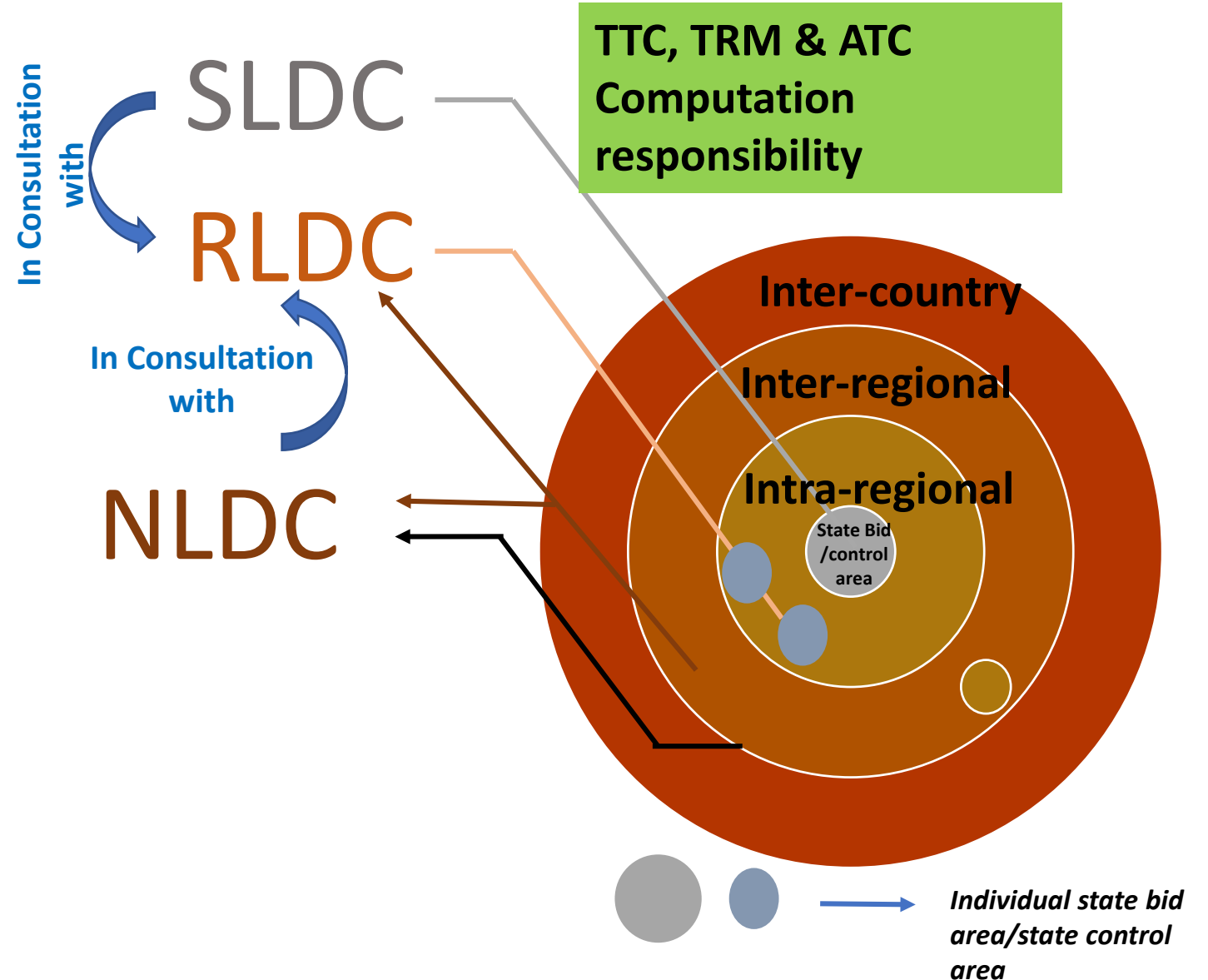
(b) RLDC :

Shall assess and declare TTC/ATC & TRM of intra-regional/inter-state system.

(c) NLDC :

Shall assess and declare TTC/ATC & TRM of inter-regional in consultation with RLDCs along with declaration of cross-border TTC/ATC

assessment



Roles & Responsibility

SLDC

RLDC

NLDC

1. Sharing of nodewise load and generation with RLDC
2. Update state network data
3. Assessment of Transfer capability of state
4. Study of impact of new intra-state element on TTC/ATC of state

1. Aggregation of state base case and updating regional ISGS generation and ISTS bulk consumer load
2. Update regional network
3. Assessment of Transfer capability of region
4. Study of impact of new regional element on TTC/ATC of region

1. Aggregation of regional base case
2. Update inter-regional and inter-national network
3. Assessment of Transfer capability of inter-region/national corridor
4. Study of impact of new element on TTC/ATC of inter-region
5. Declaration of cardinal points on the monthly load curve

Timeline for SLDC

Submission of node wise LGBR, updated latest network to RLDC + Assessment of TTC/ATC revision-0 for "M" month

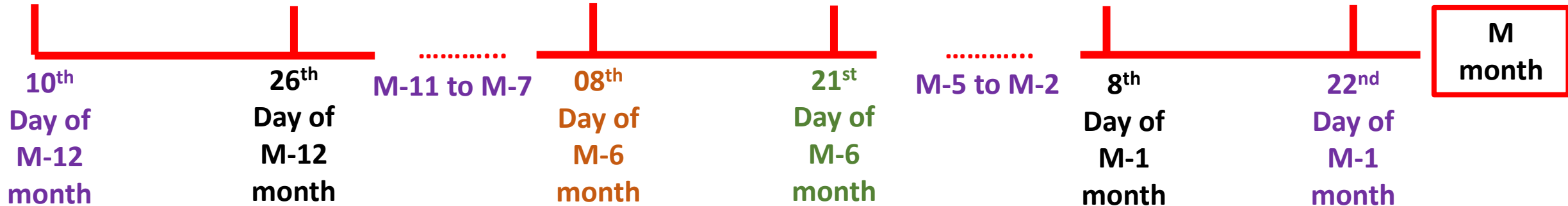
Declaration of TTC/ATC for "M" in coordination with RLDC by SLDC

Submission of node wise LGBR, updated network with elements coming up in next six month to RLDC

Sharing result of interconnection study with RLDC for month "M"

Submission of node wise LGBR, updated network to RLDC and re-assessment of TTC/ATC for month "M"

Declaration of updated TTC/ATC for "M" in coordination with RLDC by SLDC



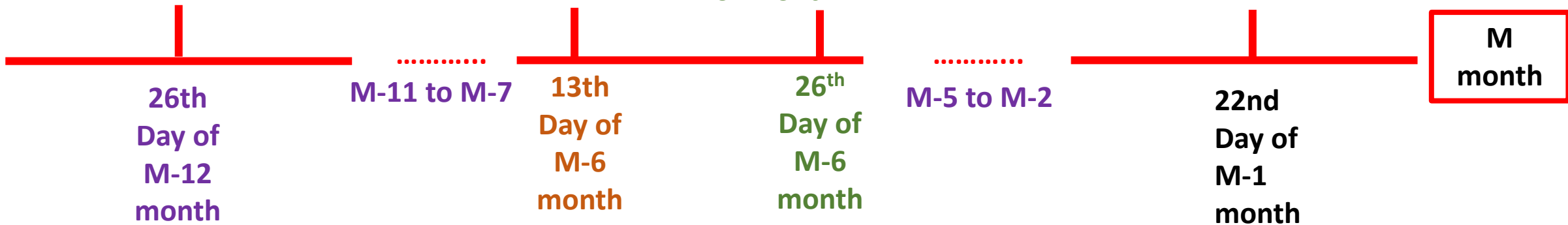
Timeline for RLDC

Using inputs from states to model intra-state elements and update state LGBR, Modelling of inter-state elements and updating regional LGBR + Assessment and declaration of TTC/ATC for the intra-regional and interstate system & sharing of n/w simulation case for “M” month

Updating state and regional LGBR & modelling of inter-state & intra-state elements coming in the next six months in the regional system base case

Sharing result of interconnection study with NLDC for month “M”

Updating state and regional LGBR and modelling of inter-state & intra-state elements in the regional base case and assessment and declaration of TTC/ATC for the intra-regional and interstate system & sharing of network simulation models for month “M”



Timeline for NLDC

Update the All-India network model & Assessment and declaration of inter-regional and cross-border TTC/ATC on the website for “M” month

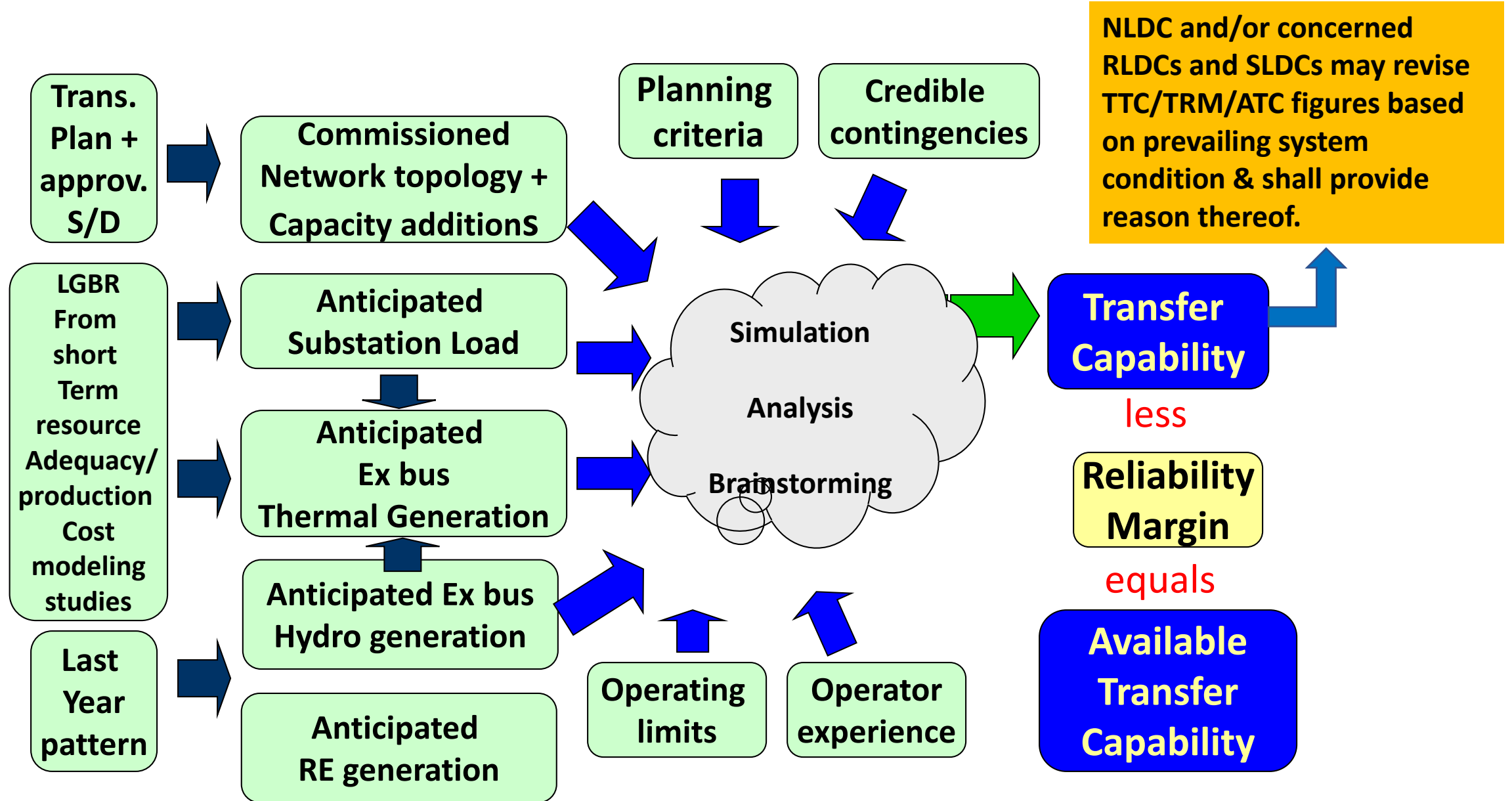
Update the All-India network model for interconnection Studies

Completion of inter-connection study for upcoming elements the next six months

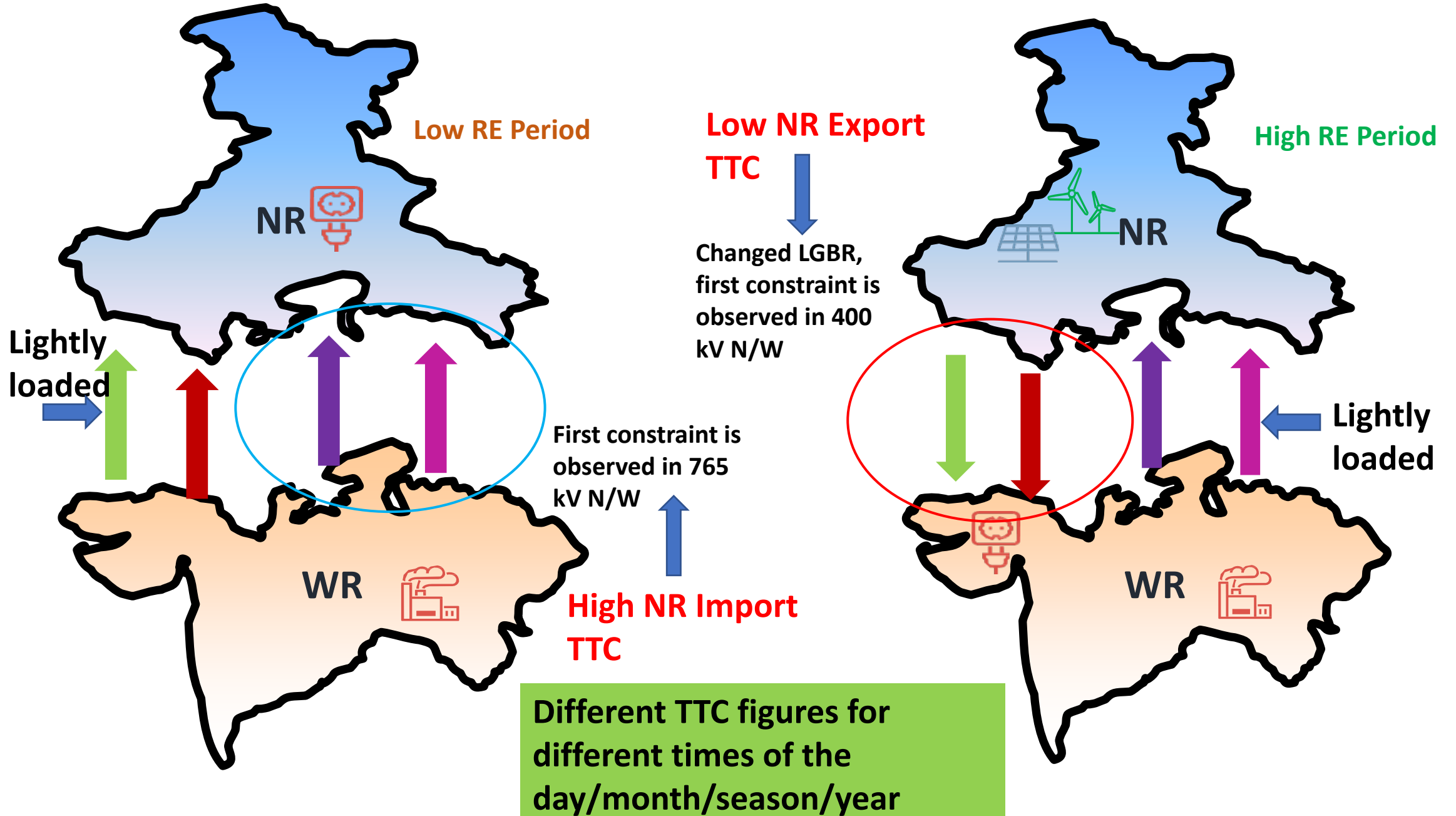
Update the All-India network model with inputs from RLDCs/SNA and Assessment and declaration of inter-regional and cross-border TTC/ATC on the website for month “M”

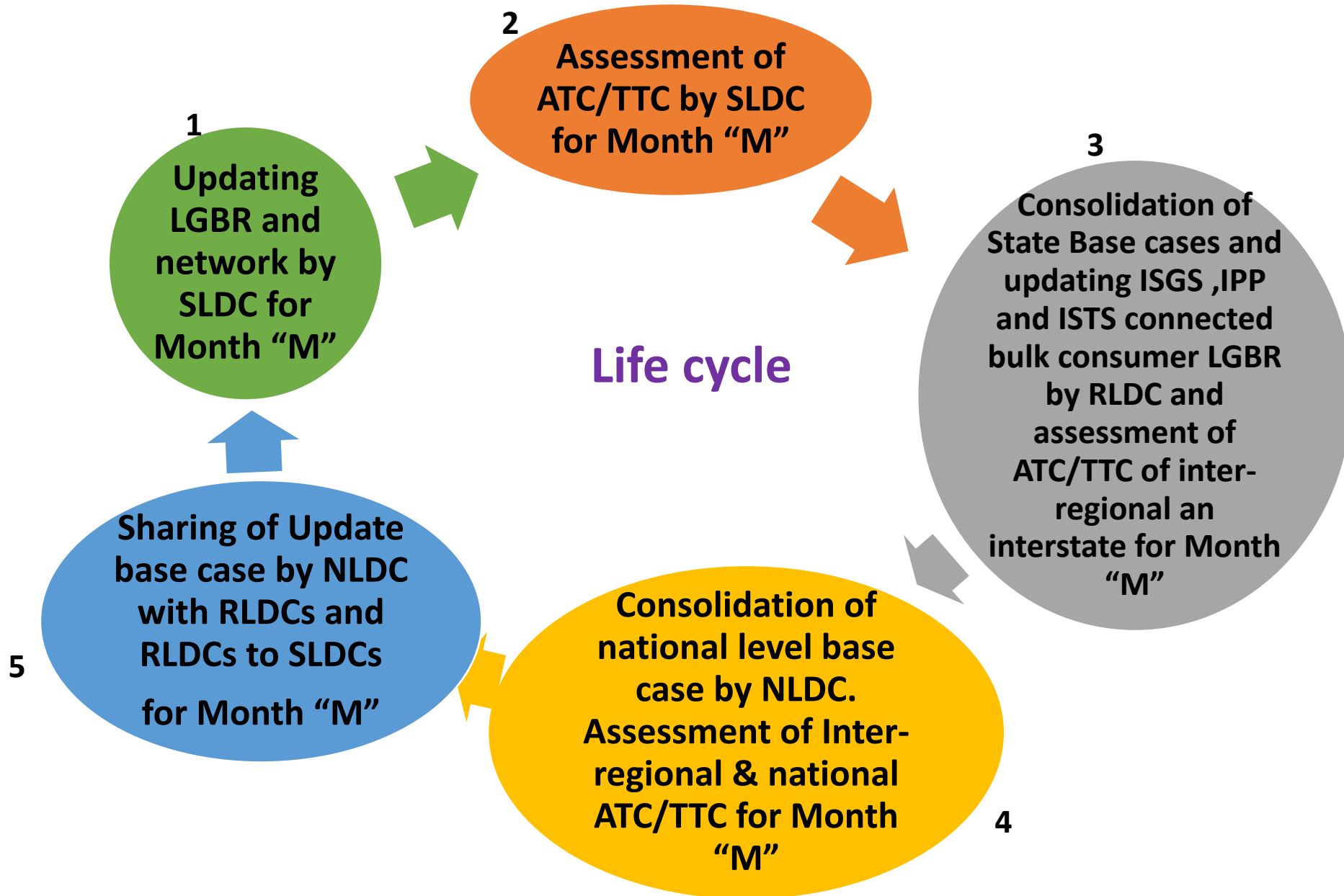


Transfer ATC Assessment

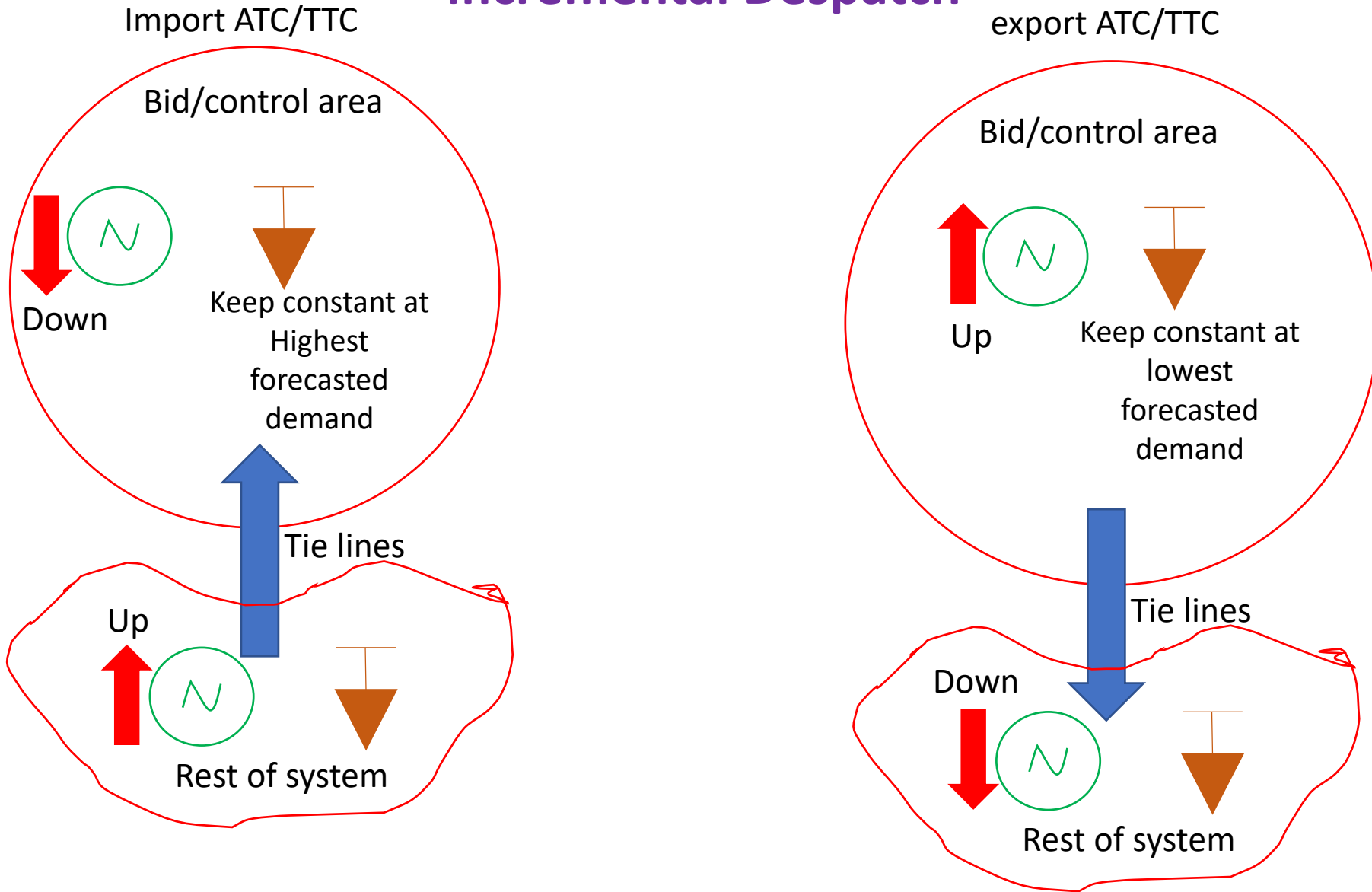


TTC is Directional & time dependent

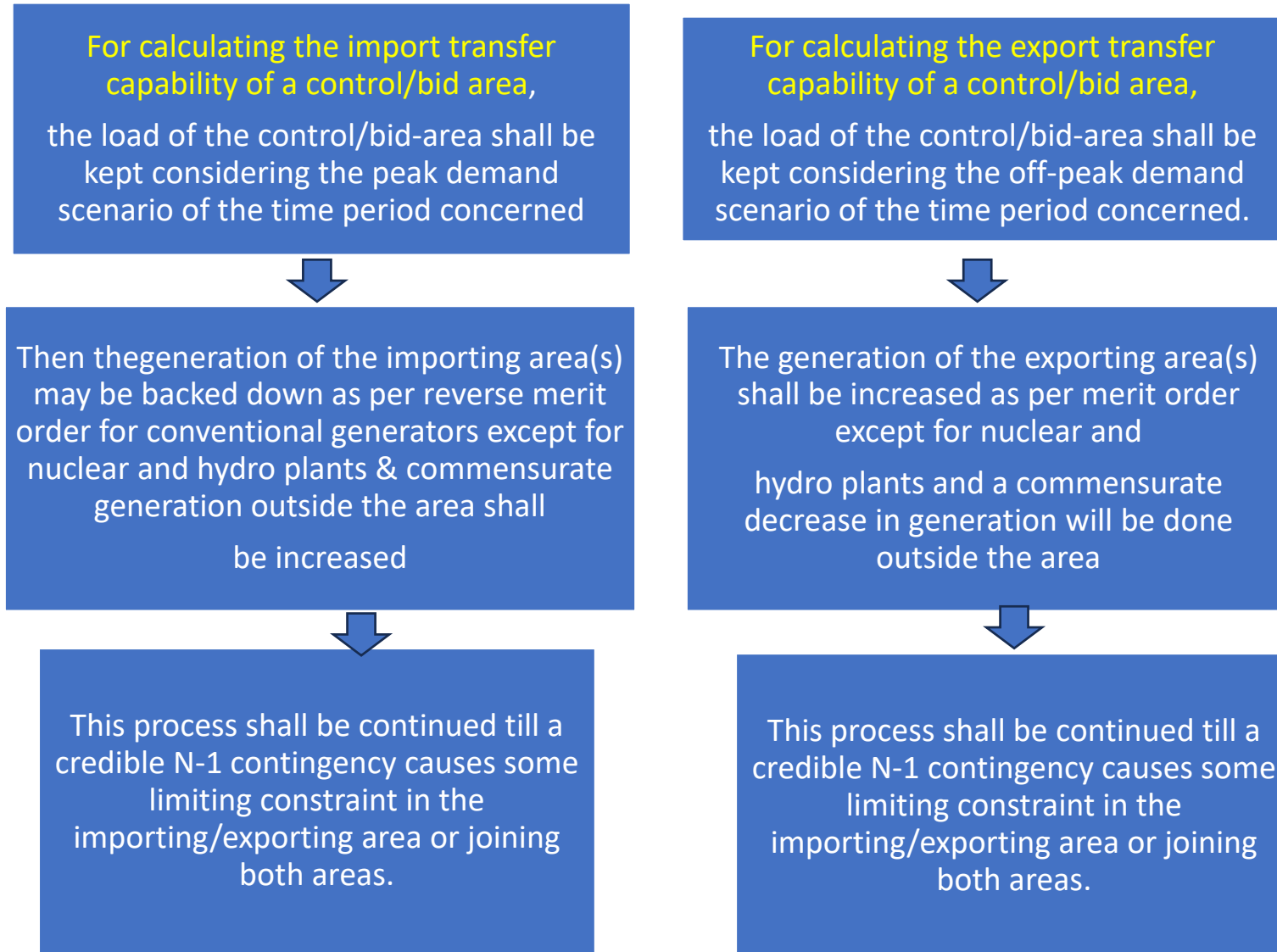




Incremental Dispatch



Incremental Dispatch

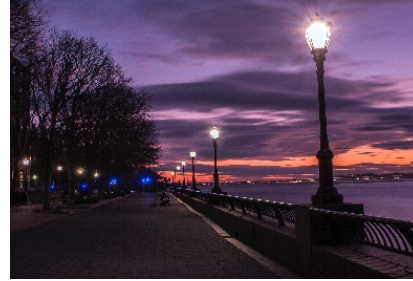


Action Points-1

- Each SLDC to declare transfer ATC & assessment of margin for both import and export, pertaining to its control area for following periods:



Solar peak



Non-Solar Peak



Non-Solar Off-Peak



Morning Peak

- Limiting constraint and reason of revision shall also be published
- RLDC/NLDC is already following this practice.

TTC, study assumptions shall be declared as per format-I

Action points-2

- ❖ 12 month rolling forecast -by SLDC, RLDC and NLDC
- ❖ Preparation of node wise sharing of MW and MVar data for load by SLDC,to be used and assimilated by RLDC,NLDC for further use
- ❖ Preparation of interconnection base case- To be start for the 1st time by SLDC, RLDC and NLDC in coordinated manner
- ❖ Requirement of usage Transmission Outage plan,generation outage plan and LGBR by RPCs as per IEGC 32.3(a)(b),on a rolling basis upto 12 months ahead.

Questions??

Thank You !!

Last date for submission of the comments on the draft procedure at nldcreliability@grid-india.in is 7th August 2023

IEGC – 2023: Relevant clauses

Regarding data sharing

As per IEGC clause 31.2(d) under Operational planning, *Each SLDC shall submit node-wise morning peak, evening peak, day shoulder and night off-peak estimated demand in MW and MVA on a monthly and quarterly basis for the nodes 110 kV and above for the preparation of scenarios for computation of TTC and ATC by the concerned RLDC and NLDC*

Under clause 32.3b of Outage Planning, *RPCs shall prepare Load Generation Balance Report (LGBR) for the respective region based on the LGBR submitted by SLDCs for their respective states and the data submitted by the regional entity generating stations, inter-State transmission licensees and other entities directly connected to ISTS in such format as may be stipulated by the RPCs and shall prepare annual outage plan for generating units and transmission elements in their respective region after carrying out necessary system studies in order to ensure system security and resource adequacy.*

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IEGC – 2023: Relevant clauses

Regarding the frequency of Transfer Capability Calculation and jurisdiction

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| <p>As per IEGC clause 33.3(a)-SLDCs shall perform day-ahead, weekly, monthly and yearly operational studies for the concerned State for:</p> <p><i>a)assessment and declaration of total transfer capability (TTC) and available transfer capability (ATC) for the import or export of electricity by the State. TTC and ATC shall be revised from time to time based on the commissioning of new elements and other grid conditions and shall be published on SLDC website with all the assumptions and limiting constraints;</i></p> | <p>Clause 33.4 states RLDCs and NLDC shall perform day-ahead, weekly, monthly and yearly operational studies for:</p> <p>(a) assessment of TTC and ATC at inter-regional, intra-regional, and inter-state levels;</p> | <p>Clause 33.5 states <i>RLDC shall assess intra-regional and inter-state level TTC and ATC and submit them to NLDC.</i></p> <p><i>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.</i></p> <p><i>TTC and ATC shall be revised from time to time based on the commissioning of new elements and other grid conditions and shall be published on the websites of the NLDC and respective RLDCs with all the assumptions and limiting constraints.</i></p> |
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IEGC – 2023: Relevant clauses

Regarding operational Planning for new elements and their potential effect on TTC

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| <p>Under clause 33.(9) <i>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.</i></p> | <p>Under clause 33.(10) <i>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.</i></p> | <p>Under clause 33.(11) 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</p> |
|--|--|--|

IEGC – 2023: Relevant clauses

Regarding the responsibility of LDCs and their jurisdiction

| | | |
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| <p>Under clause 44.1 (Responsibility of Load despatch centres)</p> <p><i>The Regional Load Despatch Centre, in discharge of its functions under the Act, shall be responsible for the following, within its regional control area:</i></p> <p><i>Assessment of transmission capability for inter-State transmission system for secure operation of the grid including but not limited to:</i></p> <p><i>(i) Assessment of TTC and ATC for inter-regional, intra-regional and inter-State levels for its region and submit it to the NLDC.</i></p> <p><i>(ii) Assessment of TTC and ATC for import or export of electricity for a State in coordination with the concerned SLDC and submit to NLDC.</i></p> <p><i>(iii) Assessment of TTC and ATC shall be done on a continuous basis at least Eleven (11) months in advance and revised based on contingencies from time to time.</i></p> <p><i>(f) Publication of TTC and ATC, as finalised by NLDC, with all the assumptions and constraints on its website</i></p> | <p>Under clause 44.2 The National Load Despatch Centre, in discharge of its functions under the Act, shall be responsible for Finalising the TTC and ATC with all assumptions and limitations based on inputs received from RLDCs and publishing the same on its website, at least three (3) months in advance, and revising them based on contingencies from time to time.</p> | <p>Under clause 44.3 f) The State Load Despatch Centre in discharge of its functions under the Act and for stable, smooth and secure operation of the integrated grid, shall be responsible declaring Total Transfer Capability and Available Transfer Capability in respect of import and export of electricity of its control area with inter-State transmission systems in coordination with the Central Transmission Utility, State Transmission Utility, and concerned RLDC and revising the same from time to time based on grid conditions. Assessment of TTC and ATC shall be done on a continuous basis at least three (3) months in advance and revised based on contingencies from time to time.</p> |
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