

# Stakeholder Workshop

## Draft Procedure for Allocation of Transmission Corridor for scheduling of GNA & T-GNA

*(In compliance to Clause No. 36/39.2 of CERC GNA Regulations)*

01<sup>st</sup> Dec 2022



Grid Controller of India Ltd.  
*(erstwhile POSOCO)*

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# Background

Central Electricity Regulatory Commission (CERC) issued Connectivity and General Network Access to the inter-State Transmission System Regulations

7<sup>th</sup> June 2022



Guideline for allocation of transmission corridor

**GNA**

**T-GNA**

CTU

GRID-INDIA

Draft procedure for allocation of transmission corridor for scheduling **GNA & T-GNA**

First Uploaded → **10<sup>th</sup> Nov 2022**

Submission of comments by: → **30<sup>th</sup> Nov 2022**

Last date for submission of the comments on draft procedure at [nldcreliability@posoco.in](mailto:nldcreliability@posoco.in) → **9<sup>th</sup> Dec 2022**

Comments received from SRPC and NAMEPL till date

# Transfer Capability: Definition in CERC Regulations

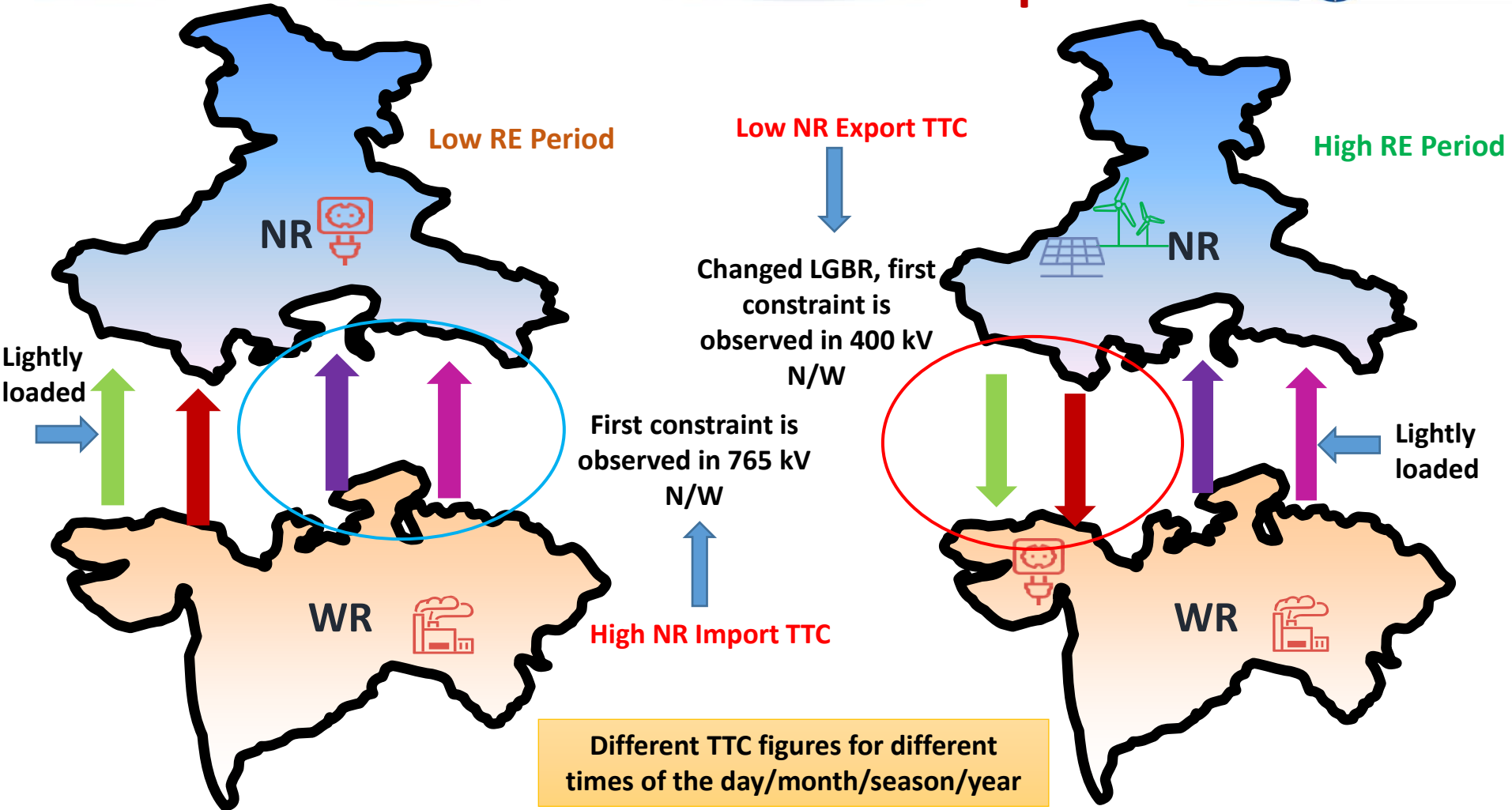
**Total Transfer Capability (TTC):** The amount of electric power that can be transferred reliably over the inter-control area transmission system under a given set of operating conditions considering the effect of occurrence of the worst credible contingency.

**Transmission Reliability Margin (TRM):** 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.

**Available Transfer Capability (ATC):** The power transfer capability of the inter-control area transmission system or across electrical regions or between ISTS and state network or between cross-border interconnections available for scheduling transactions in a specific direction, taking into account the network security declared by the concerned load despatch center. Mathematically, ATC is the Total Transfer Capability less Transmission Reliability Margin.

$$\text{ATC} = \text{TTC} - \text{TRM}$$

# TTC - Directional & Time Dependent



- Each SLDC to declare both import and export TTC/ATC, pertaining to its control area for at least following periods:



Solar peak



Non-Solar Peak

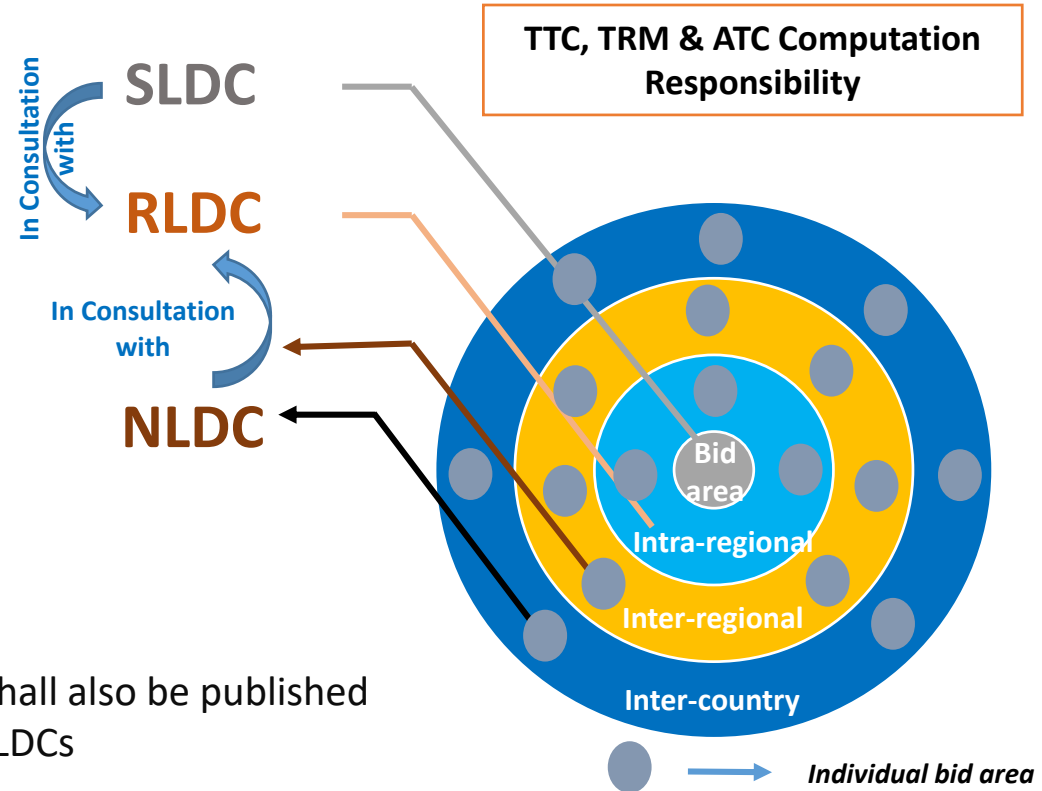


Night Off-Peak



Morning Peak

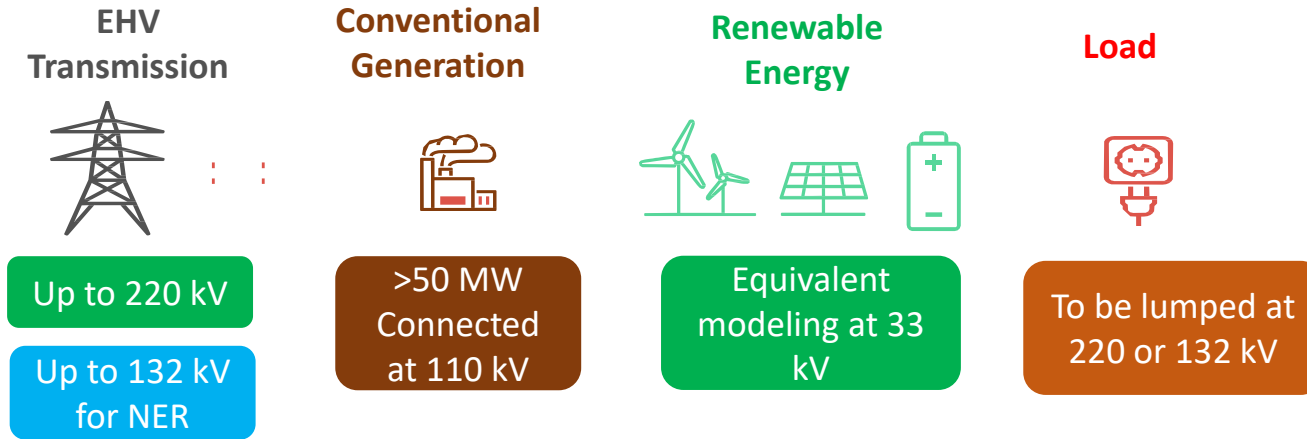
- Limiting constraint and reason of revision shall also be published
- Practice already being followed by RLDC/NLDCs



**TTC, Study Assumptions, Constraints etc. to be declared as per Format-I specified in draft procedure**

# Level of Modeling for Base Case Preparation

- Modeling of Power System to be considered by RLDC/NLDC:



- SLDC may consider lower voltage level and smaller units

## Present mechanism:

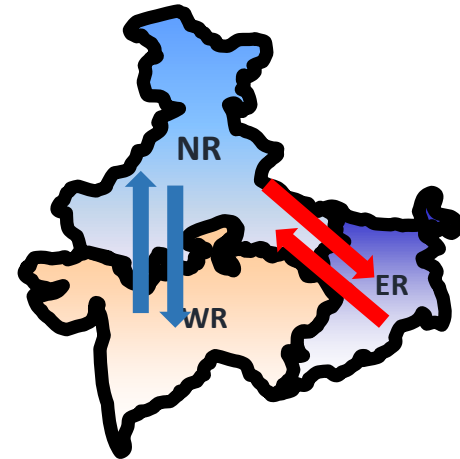
- TTC/ATC declaration is being done corridor wise & import or export ATC is being derived by arithmetic sum of individual corridor capability. For example:

$$\text{NR import TTC} = (\text{WR-NR}) \text{ TTC} + (\text{ER-NR}) \text{ TTC}$$

- Margins for short term is being calculated as:

$$\text{NR Import Margin} = \text{NR ATC} - (\text{LTA/MTOA/Allocation})$$

- Similar exercise was being done for NR export. So in total, 6 ATC limits were being computed (4 for corridor and two for import/export).

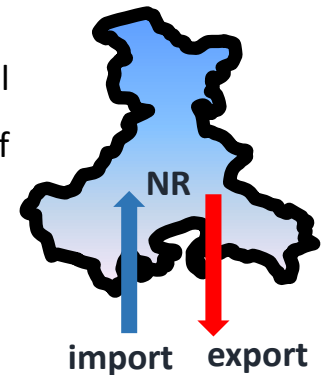


## Future mechanism:

- No corridor wise declaration of transfer capability. Only two import/export ATC of control area to be computed & to be declared on website by concerned LDCs with listing of constraints and study assumptions made during the simulation study.
- Margin for T-GNA would be calculated for import/export as follows:

$$\text{NR Import margin} = \text{NR Import TTC} - \text{GNA}^* + \text{Counterflow benefit (to be decided by NLDC)}$$

$$\text{NR Export margin} = \text{NR Export TTC} - \text{GNA}^* + \text{Counterflow benefit (to be decided by NLDC)}$$

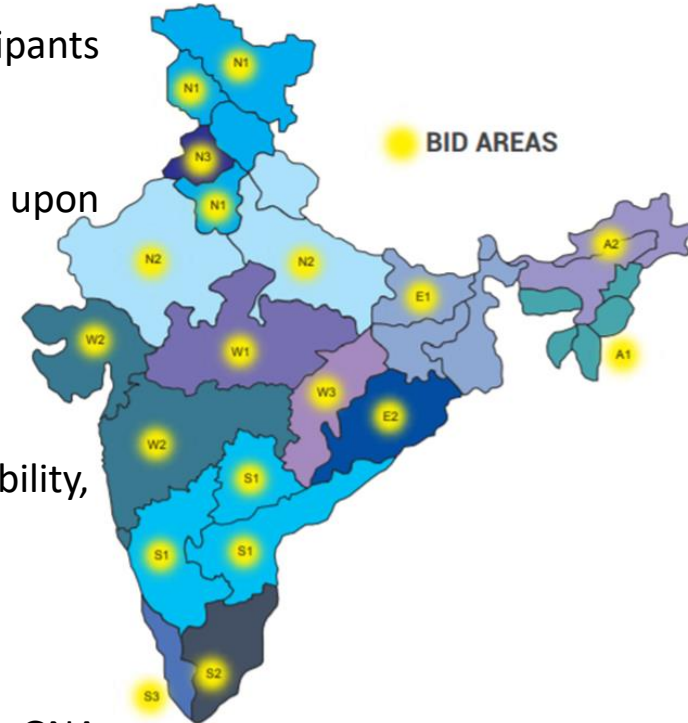




# Roles & Responsibility

## (a) Power Exchanges:

- Power Exchanges to keep the provision to configure each state as bid areas.
- **Bid Area:** Largest geographical area within which market participants are able to exchange energy without capacity allocation.
- Initially, **all states** shall be configured as bid areas.
- Additional bid areas/group of bid areas may also be configured upon intimation by **NLDC** (based on system security aspects).



## (b) Central Transmission Utility (CTUIL):

- Before granting GNA, CTU shall assess and declare transfer capability, available transfer capability, Transmission reliability margin of:
  - (i) Region
  - (ii) Intra-region/group of bid or control area
  - (iii) Individual bid/control area
- CTU shall provide interface for communicating approved GNA quantum to NLDC from time to time

# Roles & Responsibility

## (c) SLDCs :

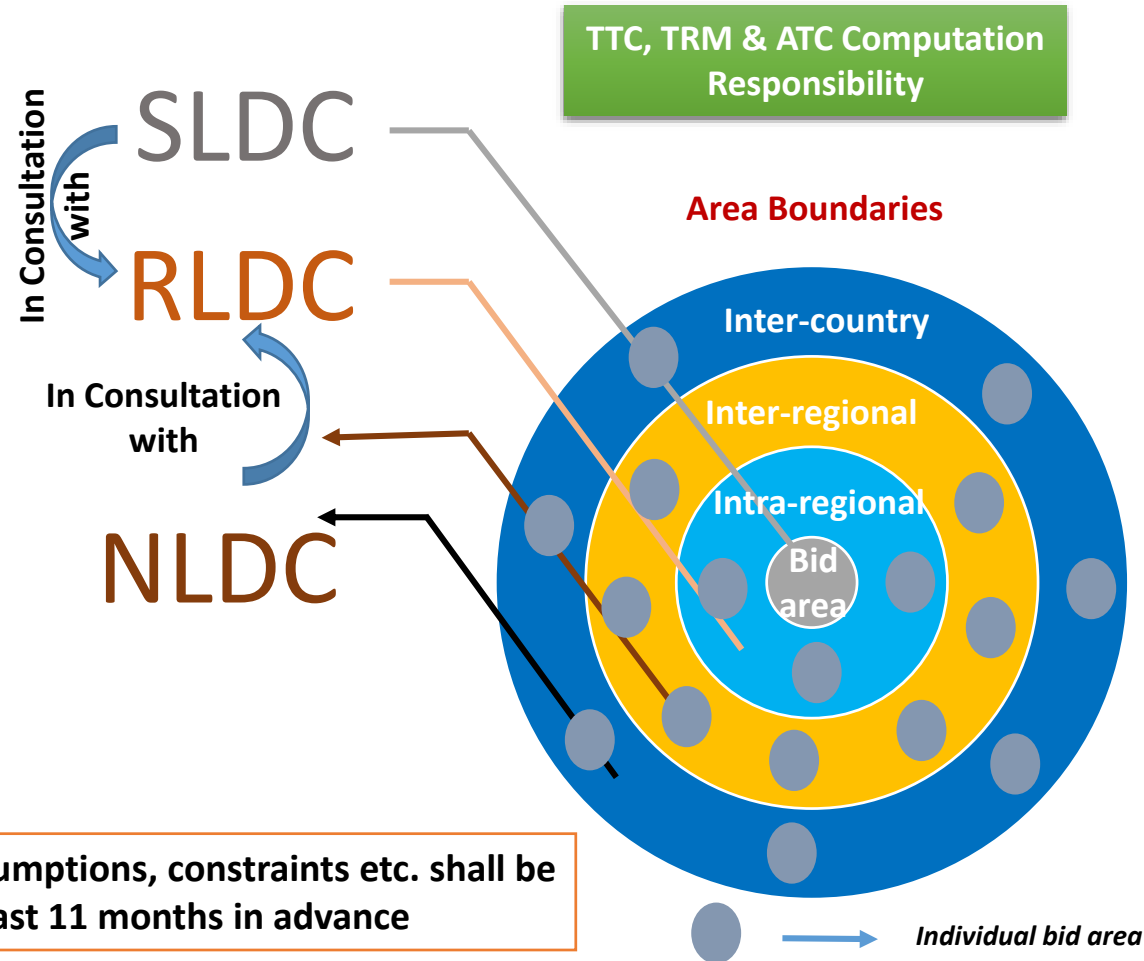
- Shall assess and declare TTC/ATC & TRM of individual state bid area in consultation with RLDCs

## (d) RLDCs :

- Shall assess and declare TTC/ATC & TRM of intra-regional/group of control areas

## (e) NLDC :

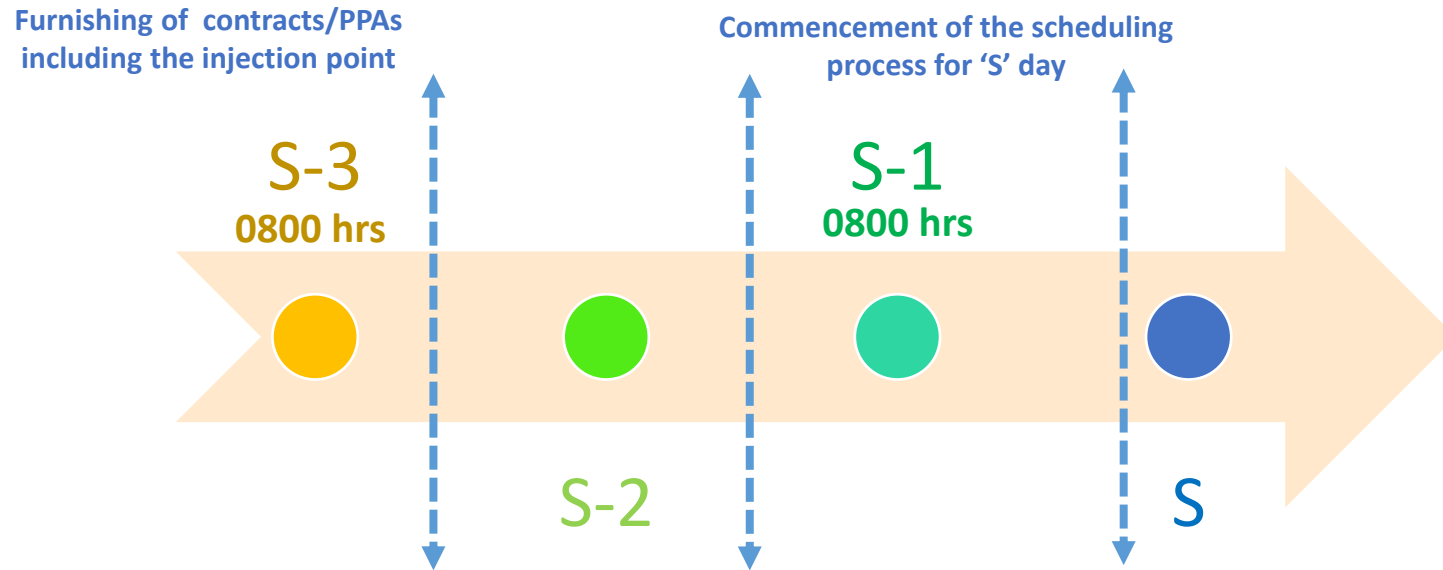
- Creation of additional bid area based on the requirement
- Shall assess and declare TTC/ATC & TRM of regional bid/control area in consultation with RLDCs along with declaration of cross-border TTC/ATC.



**TT/ATC along with basis of calculations, assumptions, constraints etc. shall be published on respective LDC's website at least 11 months in advance**

## Commencement of Scheduling for 'S' day

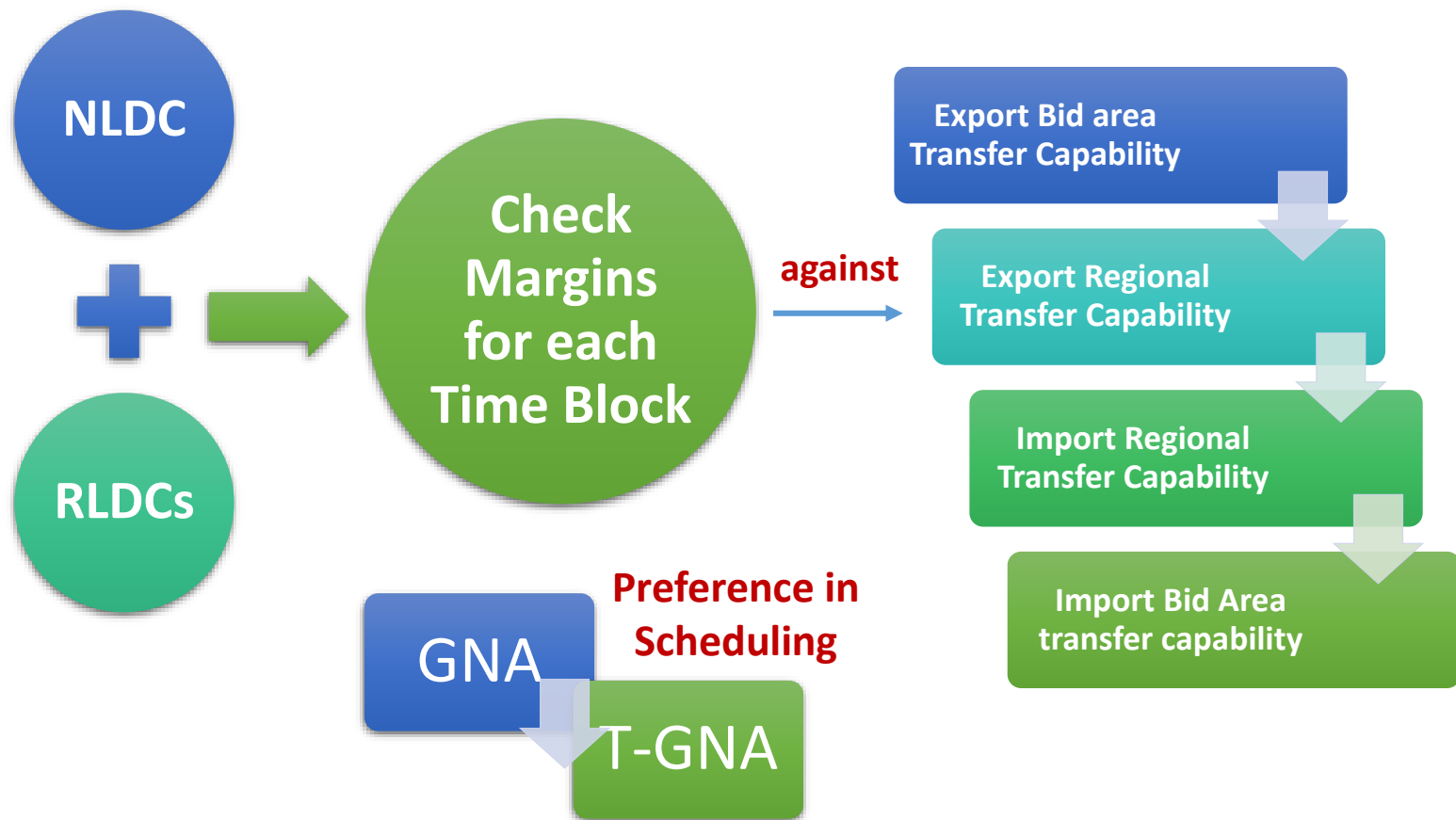
- Scheduling process to start at 0800 hrs of 'S-1' day with 'S' being the day of scheduling



- First, GNA transactions will be given priority over T-GNA. Subsequently, within T-GNA, applications under different categories will be processed as per following sequence :

Advance application → Day ahead collective transaction → Bilateral Exigency → Real time collective transaction

# Overview of Allocation of Transmission Corridor for Scheduling

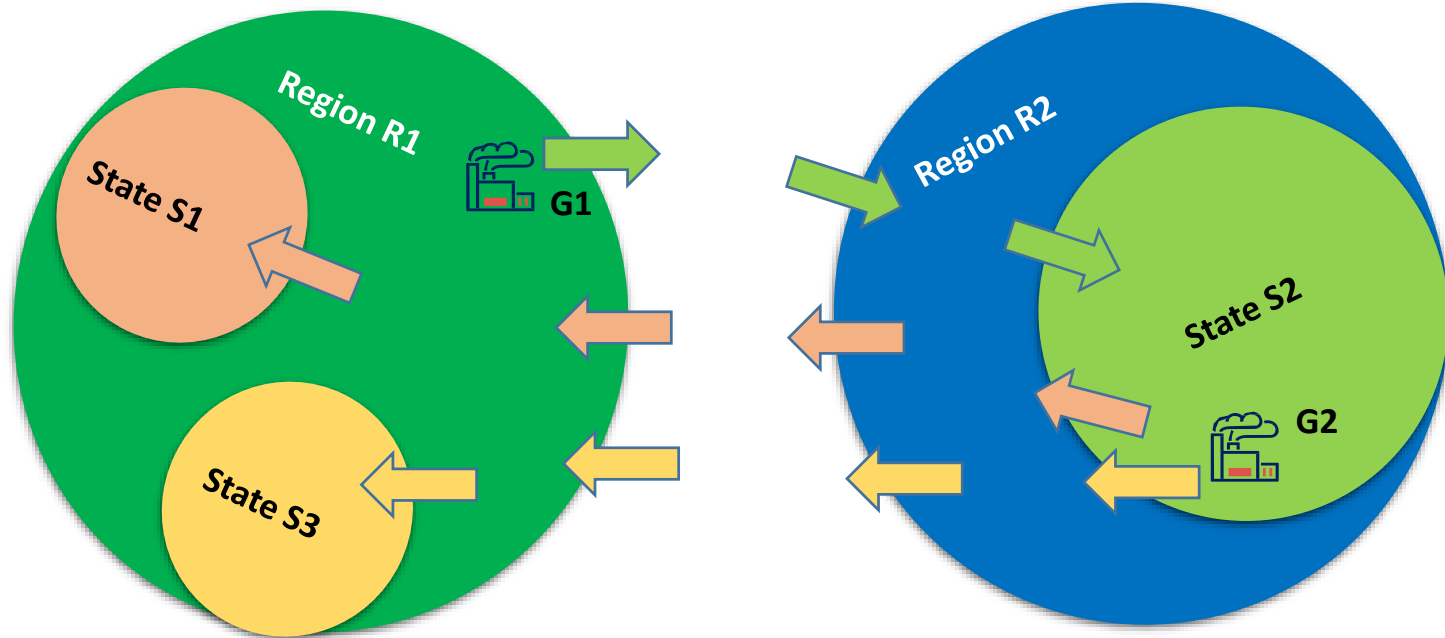


- First, the GNA grantees shall be eligible to schedule power within the GNA granted to them
- Subsequently, T-GNA grantees shall be eligible to schedule power on the balance margin

# Margin Calculation Methodology – Test Case

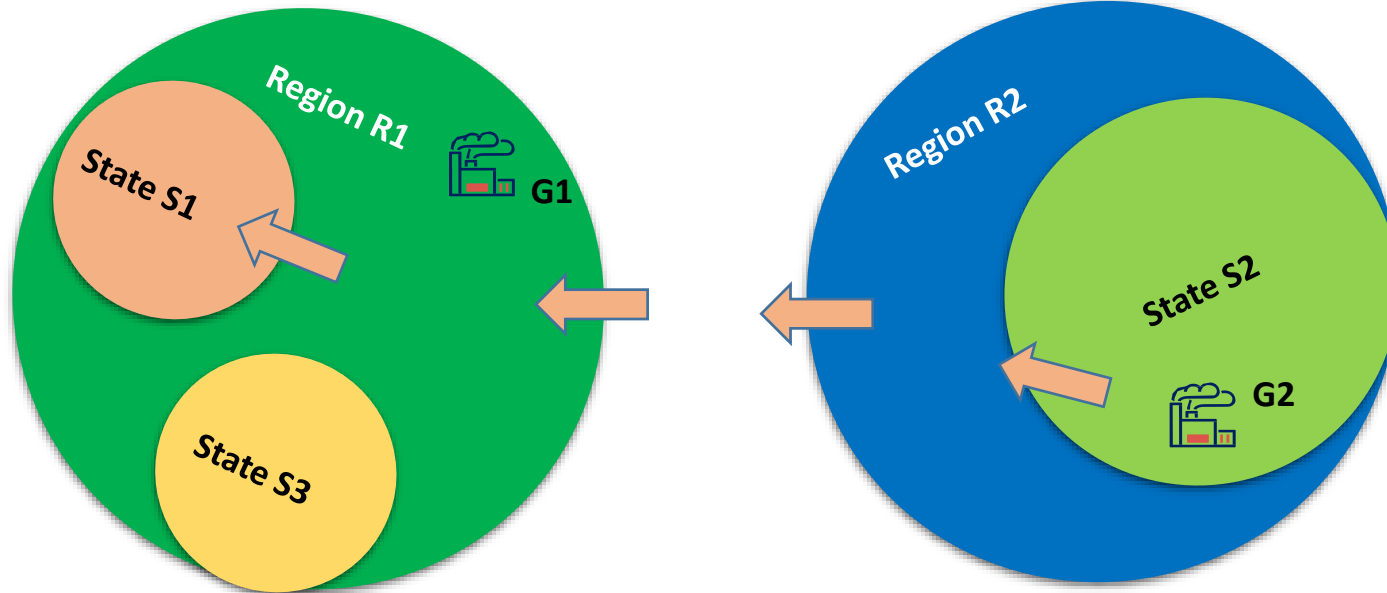
## Test Case:

- Assuming, there are two generator G1 and G2 from which states S1, S2 and S3 have applied for different types of transactions



# Margin Calculation Methodology: Test Case-1

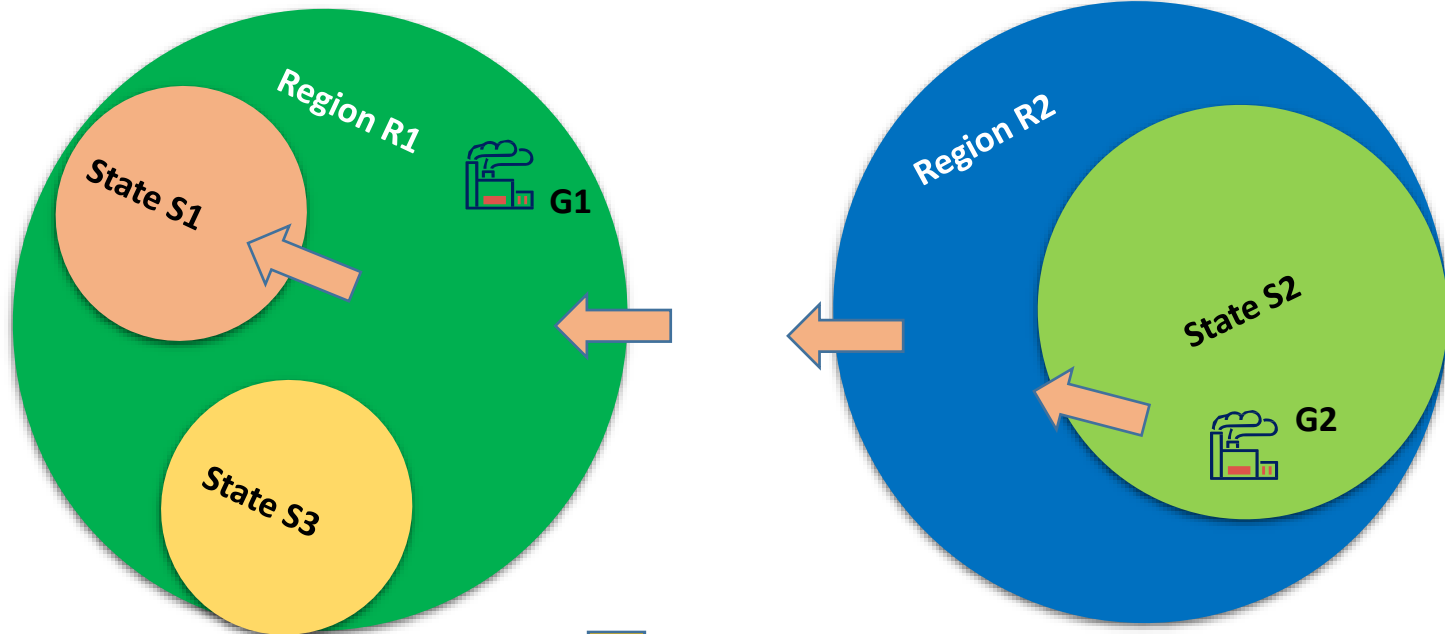
Transaction Types	State - S2		Region - R2		Region - R1		State - S1		State - S3		Final accepted Quantum (MW)
	I-ATC (500)	E- ATC (500)	I-ATC (300)	E- ATC (300)	I-ATC (200)	E-ATC (200)	I-ATC (150)	E- ATC (150)	I-ATC (50)	E- ATC (50)	
Case -1 : State S1 applies for 100 MW from generator G2 under GNA	X	✓ (100)	X	✓ (100)	✓ (100)	X	✓ (100)	X	X	X	S1 - 100



✓ - Passed   
 X - Not required to be Checked   
 P - Partially allowed

# Margin Calculation Methodology: Test Case-2

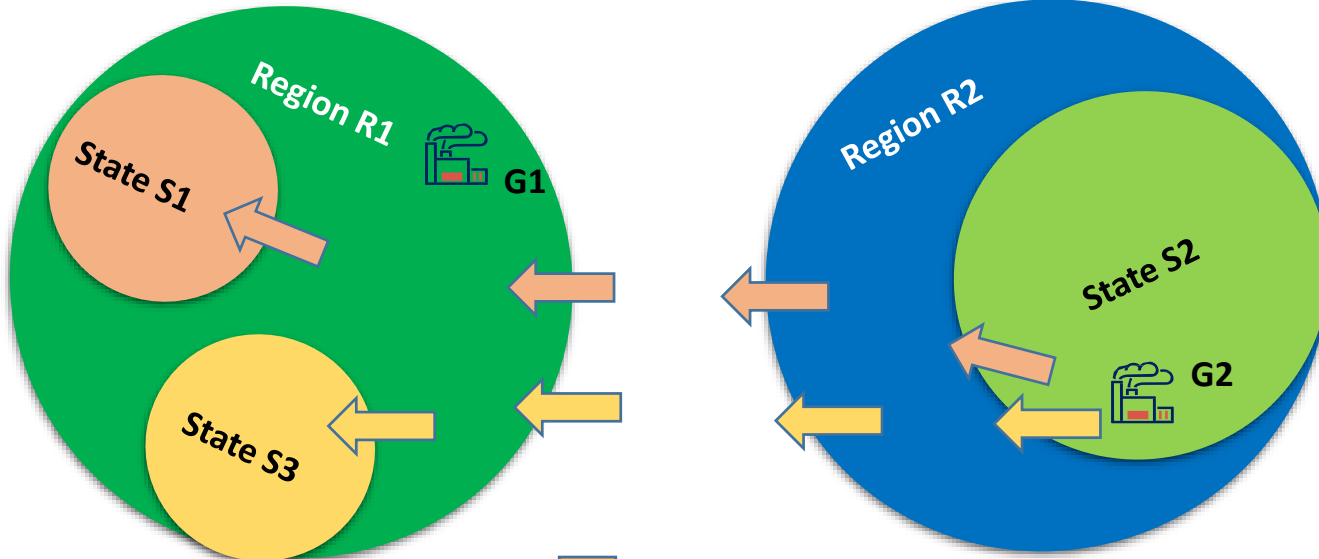
Transaction Types	State - S2		Region - R2		Region - R1		State - S1		State - S3		Final accepted Quantum (MW)
	I-ATC (500)	E- ATC (500)	I-ATC (300)	E- ATC (300)	I-ATC (200)	E-ATC (200)	I-ATC (150)	E- ATC (150)	I-ATC (50)	E- ATC (50)	
Case-2 : State S1 applies for 350 MW from generator G2 under GNA	X	✓ (350)	X	P (300)	P (200)	X	P (150)	X	X	X	S1 - 150



✓ - Passed   
 X - Not required to be Checked   
 P - Partially allowed

# Margin Calculation Methodology: Test Case-3

Transaction Types	State - S2		Region - R2		Region - R1		State - S1		State - S3		Final accepted Quantum (MW)
	I-ATC (500)	E- ATC (500)	I-ATC (300)	E- ATC (300)	I-ATC (200)	E-ATC (200)	I-ATC (150)	E- ATC (150)	I-ATC (50)	E- ATC (50)	
Case-3 : State S1 and S3 apply for 200 MW GNA and 200 MW from generator G2 under TGNA (Advance)	X	✓ S1-200 S3-200	X	P S1-200 S3-100	P S1-200 S3-0	X	P S1-150 S3-0	X	✓	X	S1 -150 S3 - 0

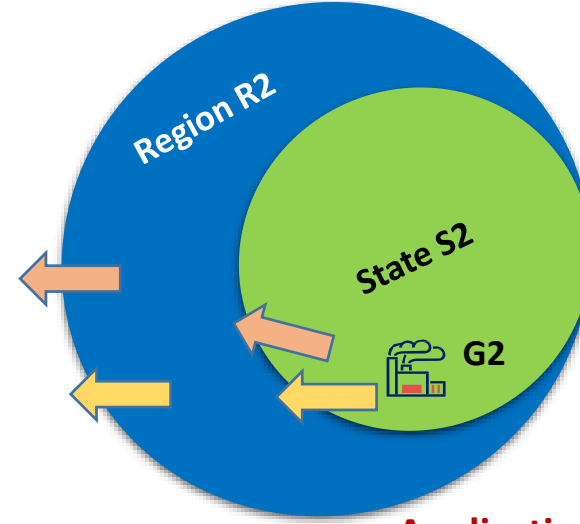
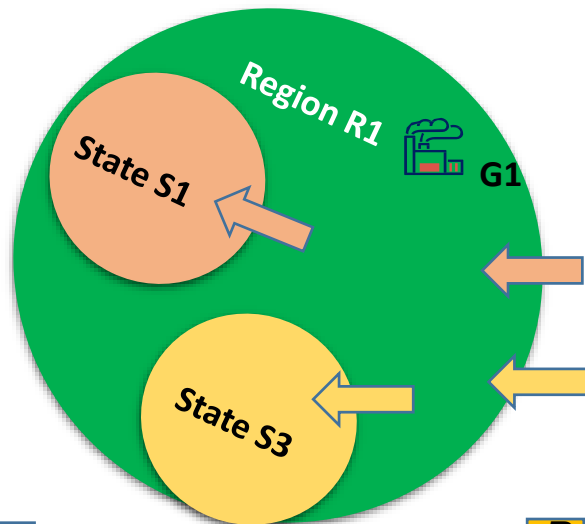


✓ - Passed   
 X - Not required to be Checked   
 P - Partially allowed



# Margin Calculation Methodology: Test Case-4

Transaction Types	State - S2		Region - R2		Region - R1		State - S1		State - S3		Final accepted Quantum (MW)
	I-ATC (500)	E- ATC (500)	I-ATC (300)	E- ATC (300)	I-ATC (200)	E-ATC (200)	I-ATC (150)	E- ATC (150)	I-ATC (50)	E- ATC (50)	
Case-4 : State S1 and S3 apply for 200 MW and 100 MW from generator G2 under TGNA (Advance)	X	✓ S1-200 S3-100	X	✓ S1-200 S3-100	P S1-133.33 S3-66.67	X	✓ S1-133.33 S3-66.67	X	✓ S1-133.33 S3-50	X	S1 – 133.33 S3 - 50



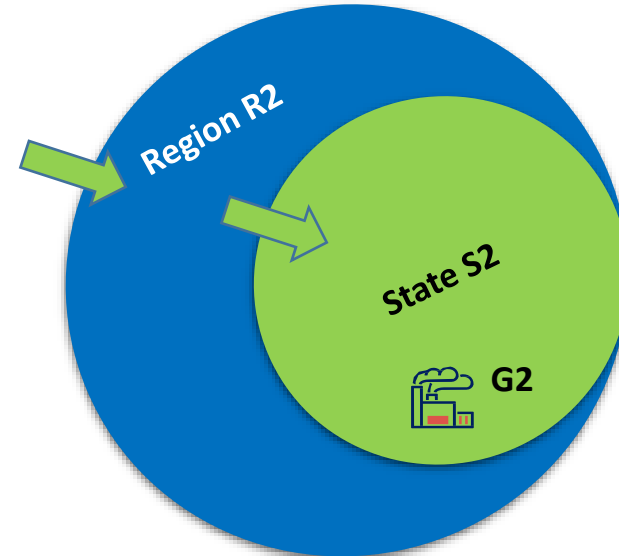
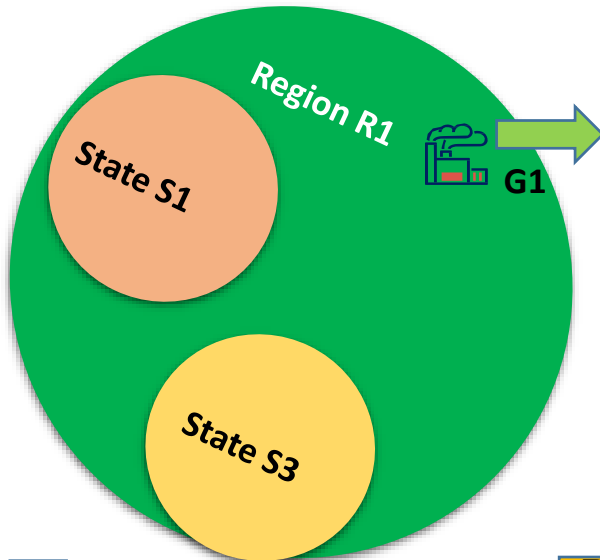
Under exigency case, priority will be given in the sequence of time stamping

✓ - Passed   
 X - Not required to be Checked   
 P - Partially allowed

**Application Time – S1 → S3**

# Margin Calculation Methodology: Test Case-5

Transaction Types	State - S2		Region - R2		Region - R1		State - S1		State - S3		Final accepted Quantum (MW)
	I-ATC (500)	E- ATC (500)	I-ATC (300)	E- ATC (300)	I-ATC (200)	E-ATC (200)	I-ATC (150)	E- ATC (150)	I-ATC (50)	E- ATC (50)	
Case-5 : State S2 applies for 500 MW from generator G1 under TGNA	✓ S2 - 200	X	✓ S2 - 200	X	X	P S2 - 200	X	X	X	X	S2 - 200



✓ - Passed    
 X - Not required to be Checked    
 P - Partially allowed

# Margin Calculation Methodology – Test Case

Transaction Types	State - S2		Region - R2		Region - R1		State - S1		State - S3		Final accepted Quantum (MW)
	I-ATC (500)	E- ATC (500)	I-ATC (300)	E- ATC (300)	I-ATC (200)	E-ATC (200)	I-ATC (150)	E- ATC (150)	I-ATC (50)	E- ATC (50)	
Case -1 : State S1 applies for 100 MW from generator G2 under GNA	X	✓ (100)	X	✓ (100)	✓ (100)	X	✓ (100)	X	X	X	S1 - 100
Case-2 : State S1 applies for 350 MW from generator G2 under GNA	X	✓ (350)	X	P (300)	P (200)	X	P (150)	X	X	X	S1 - 150
Case-3 : State S1 and S3 apply for 200 MW GNA and 200 MW from generator G2 under TGNA	X	✓ S1-200 S3-200	X	P S1-200 S3-100	P S1-200 S3-0	X	P S1-150 S3-0	X	✓	X	S1 -150 S3 - 0
Case-4 : State S1 and S3 apply for 200 MW and 100 MW from generator G2 under TGNA*	X	✓ S1-200 S3-100	X	✓ S1-200 S3-100	P S1-133.3 S3-66.7	X	✓ S1-133.3 S3-66.7	X	✓ S1-133.33 S3-50	X	S1 - 133.33 S3 - 50
Case-4 : State S1 and S3 apply for 200 MW and 100 MW from generator G2 under TGNA^	X	✓ S1-200 S3-100	X	✓ S1-200 S3-100	P S1-200 S3-0	X	P S1-150 S3-0	X	✓ S1-150 S3-0	X	S1 - 150 S3 - 0
Case-5 : State S2 applies for 500 MW from generator G1 under TGNA*	✓ S2 - 200	X	✓ S2 - 200	X	X	P S2 - 200	X	X	X	X	S2 - 200



- Passed

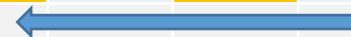


- Not required to be Checked



- Partially allowed

\*T-GNA Advance Category  
^T-GNA Exigency Categories



# Scheduling of Transactions under “GNA”



SLDCs on behalf of the  
intra-State entities

Regional entities

Furnishing of contracts/PPAs  
including the injection point

S-3  
0800 hrs



S-2



Time Block Wise  
requisition

S-1  
0800 hrs



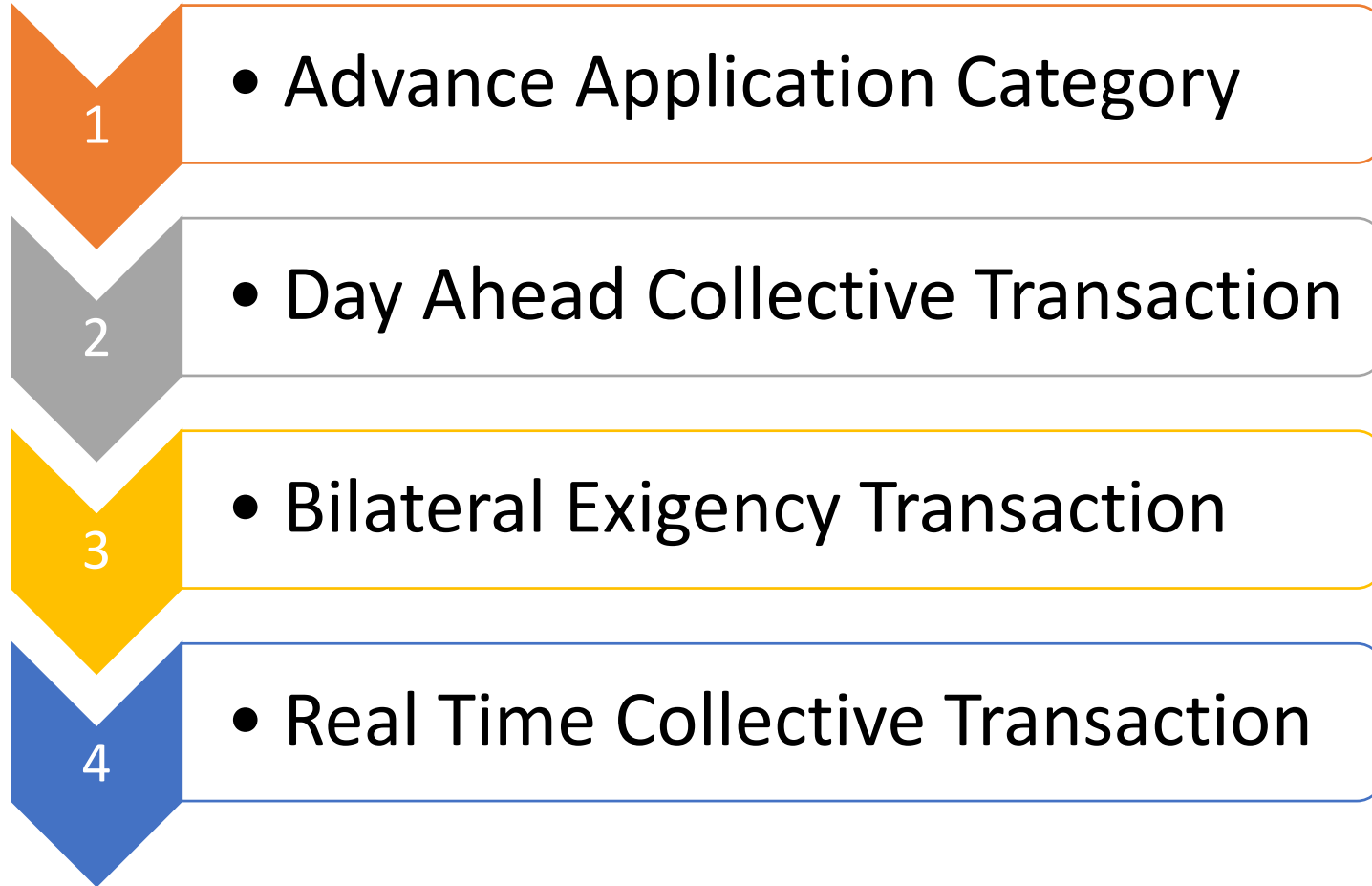
Requisition to be  
punched in WBES



S

*\*S is the day of scheduling*

- RLDCs to check injection/drawl schedule for each time block against ATC
- In case of any constraint, corridor to be allocated in proportion to their GNA



# Scheduling of Transactions under “Advance Application” Category

T-GNA Grantee to furnish details of PPAs including the injection point latest by 0800 hrs of S-3 day

S-3

0800 hrs



T-GNA Grantee to punch Time Block Wise drawl requisition in WBES of concerned RLDC

S-1

0800 hrs



If above information is not furnished within the timeline, such transaction will not be considered for scheduling

S-2



Information to be transferred from RLDC to NOAR



S

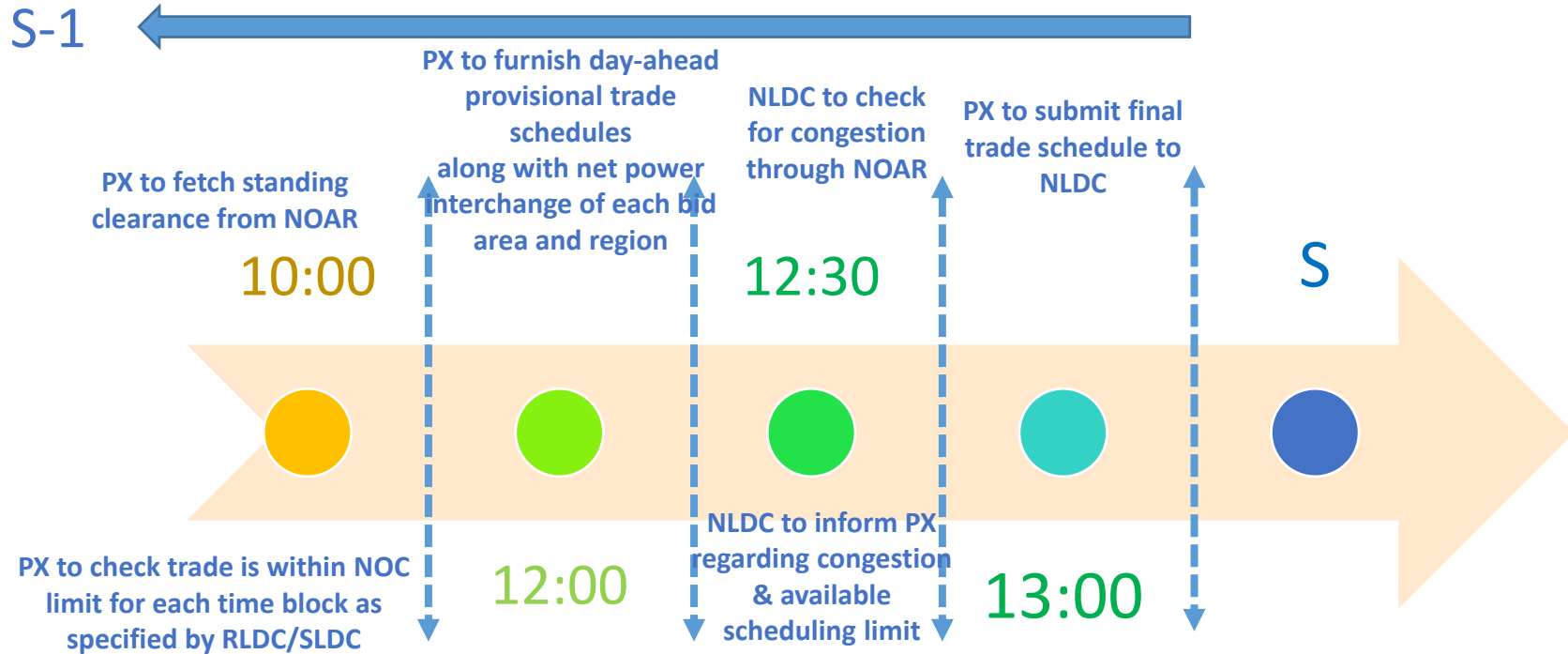
- RLDCs to check injection/drawl schedule for each time block against ATC
- In case full T-GNA quantum can't be accommodated, corridor to be allocated for scheduling on pro-rata basis in proportion of granted T-GNA quantum

Import T-GNA margin = Import ATC – Import Schedule (GNA) + 'A'% Export Schedule (GNA)

Export T-GNA margin = Export ATC – Export Schedule (GNA) + 'B'% Import Schedule (GNA)

*\*S is the day of scheduling*

# Scheduling of Transactions under “Day Ahead Collective Transaction”



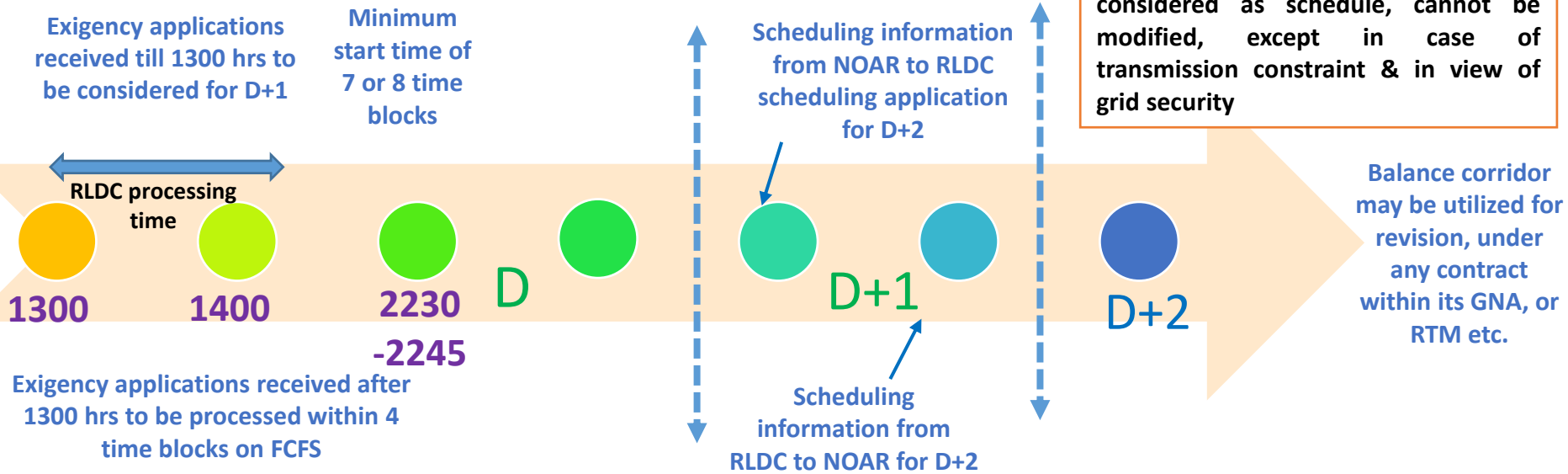
\*S is the day of scheduling

➤ In case of congestion, allocation of available corridor margin among the power exchanges shall be in the ratio of the initial trade volume in MW submitted by the respective power exchanges

**Import T-GNA Margin = Import ATC – Import Schedule (GNA) + ‘M’% Export Schedule (GNA+TGNA)**  
**Export T-GNA Margin = Export ATC – Export Schedule (GNA) + ‘N’% Import Schedule (GNA+TGNA)**

# Scheduling of Transactions Under Exigency Bilateral transaction

Submission of application for grant of T-GNA with scheduling for (S) day or (D+1) day or (D+2) day



- For each time block, requests shall initially be checked against the available transfer ATC of the control areas sequentially.
- RLDC may approve full or partial quantum (duly consented by applicant) in proportion of their granted T-GNA quantum

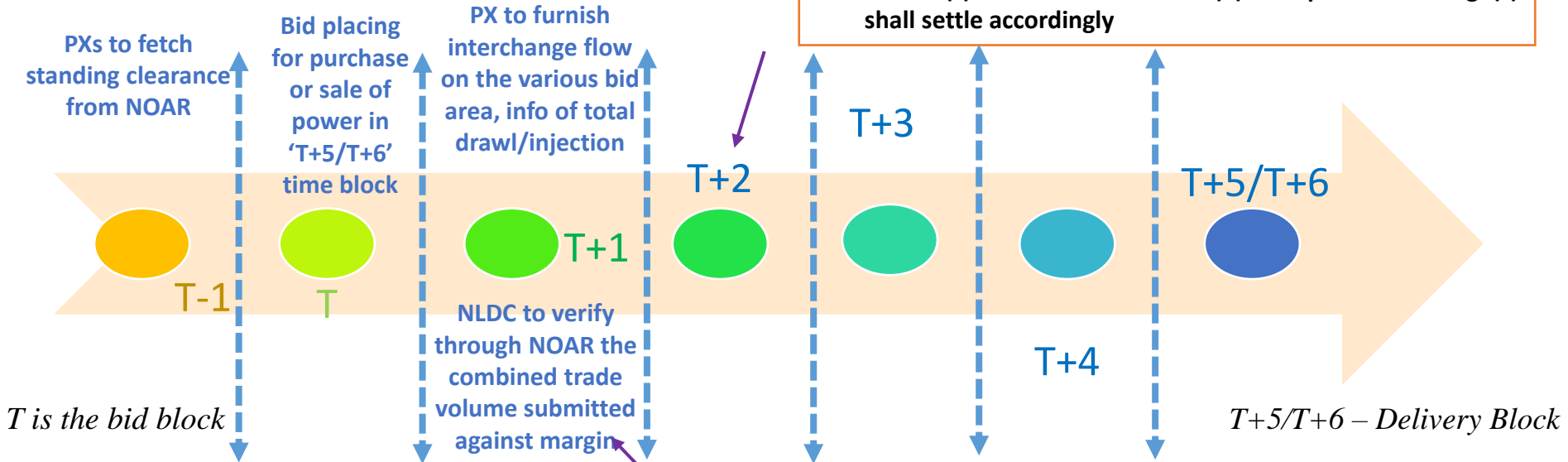
Import T-GNA margin = Import ATC – Import Schedule (GNA) + 'X'% Export Schedule (GNA+TGNA)  
 Export T-GNA margin = Export ATC – Export Schedule (GNA) + 'Y'% Import Schedule (GNA+TGNA)

\*D / D+1 / D+2 are the days for delivery



# Scheduling of Transactions under “Real Time Collective Transactions”

- If cleared volume > margin, NLDC to make trade quantum zero & send exception report to concerned PX
- During communication failure, schedules for such RTM session(s) shall be made zero (0) and power exchange(s) shall settle accordingly

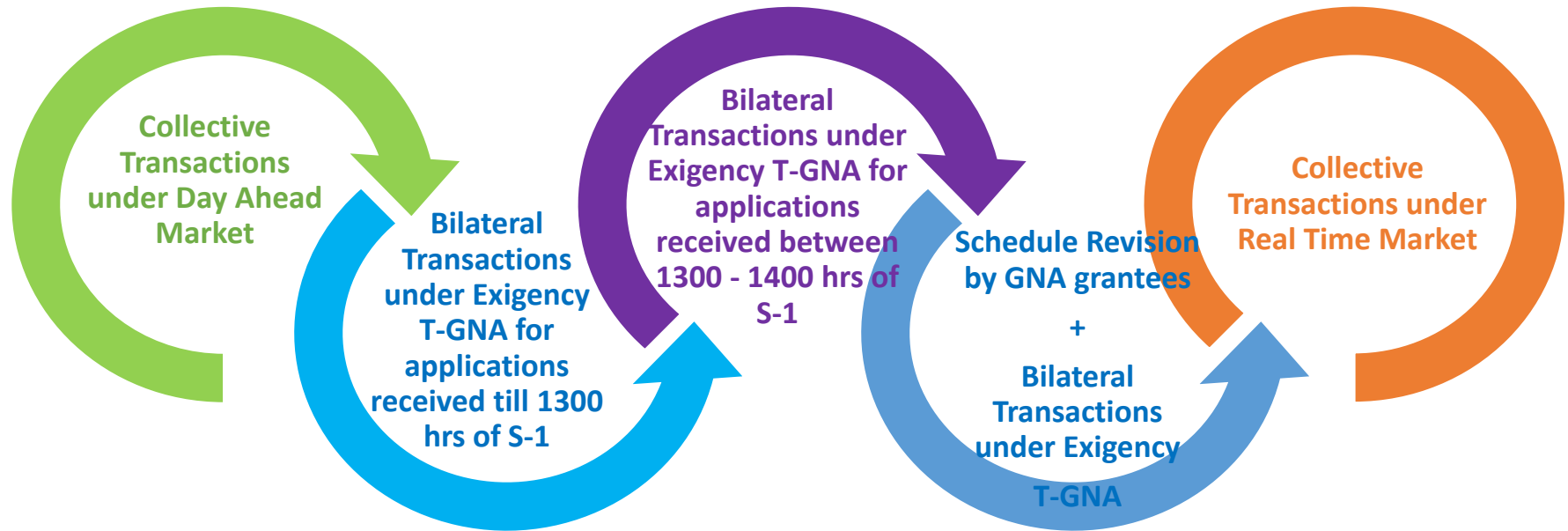


- If combined trade ≤ available margin, NLDC to confirm initial request through NOAR
- If combined trade > available margin, allocation to be done in ratio of initial trade volume submitted
- PX to submit final schedule through NOAR

Import T-GNA margin = Import ATC – Import Schedule(GNA) + 'G'% Export Schedule (GNA+TGNA)  
 Export T-GNA margin = Export ATC – Export Schedule(GNA) + 'H'% Import Schedule (GNA+TGNA)

## Release of unutilized T-GNA Quantum

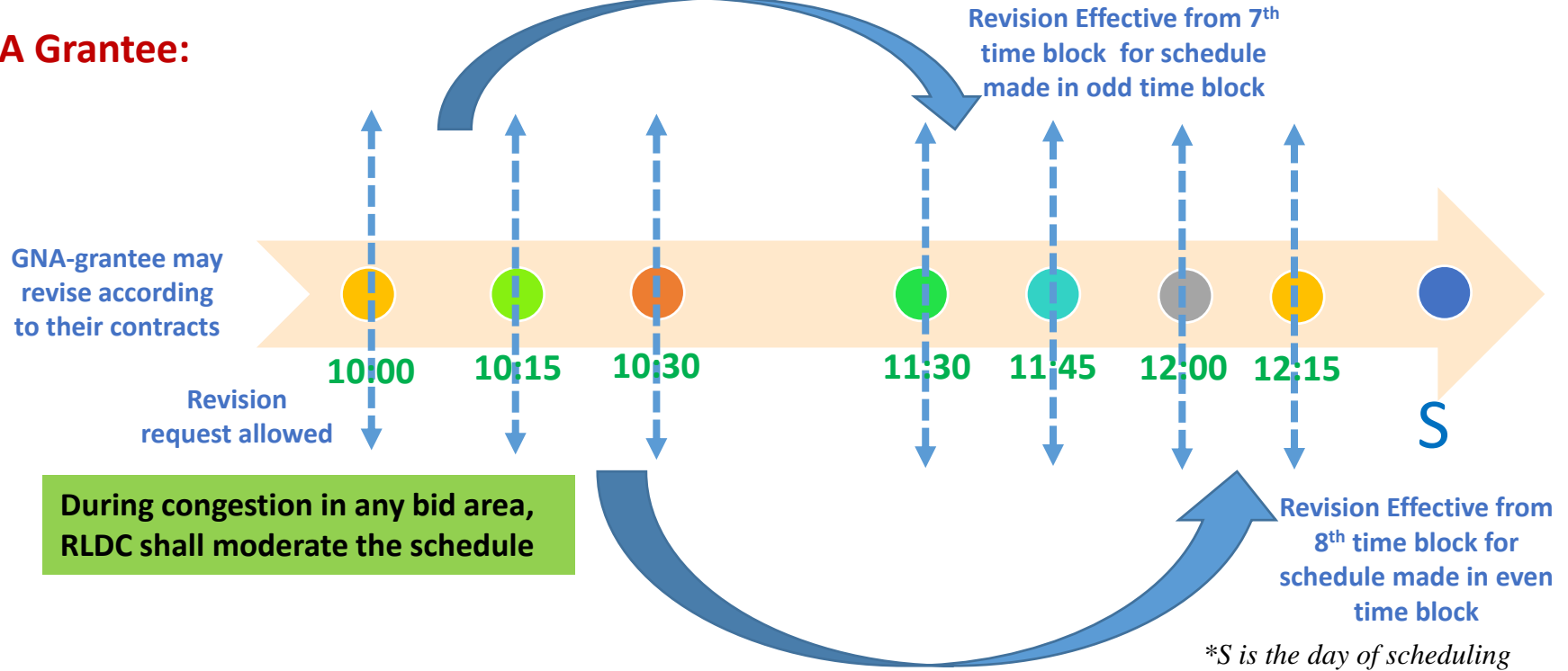
- In case, any T-GNA grantee does not schedule power up to its T-GNA quantum at the time of making the scheduling request the unutilized quantum of T-GNA shall be released in the following sequence:



**GNA Schedule Revisions and T-GNA applications after 1400 hours shall be scheduled as per chronology of receipt of applications**

# Revision of Schedule under GNA

## GNA Grantee:



## T-GNA Grantee:

**Scheduled transactions under T-GNA once scheduled can't be modified except in case of congestion management or in view of grid security**

# Scheduling of Cross-Border Transactions

- All import/ and export of electricity through cross border electricity transactions shall take place only after approval of the Designated Authority (DA) except Inter Government-to-Government Agreement.
- Indian entity(ies) trading the power of domestic origin, in Day Ahead Market (DAM) in power exchanges may not require any approval from DA. For other segments, it has to obtain the approval of DA.
- Trading licensee on behalf of cross border buyer(s) in terms of the Cross Border Regulations for injection into or drawl from the Indian grid may apply for T-GNA.
- In case of direct Power Purchase Agreement (PPA) between an Indian seller and cross border entity, the SNA shall apply on behalf of the cross-border entity

## To be governed by

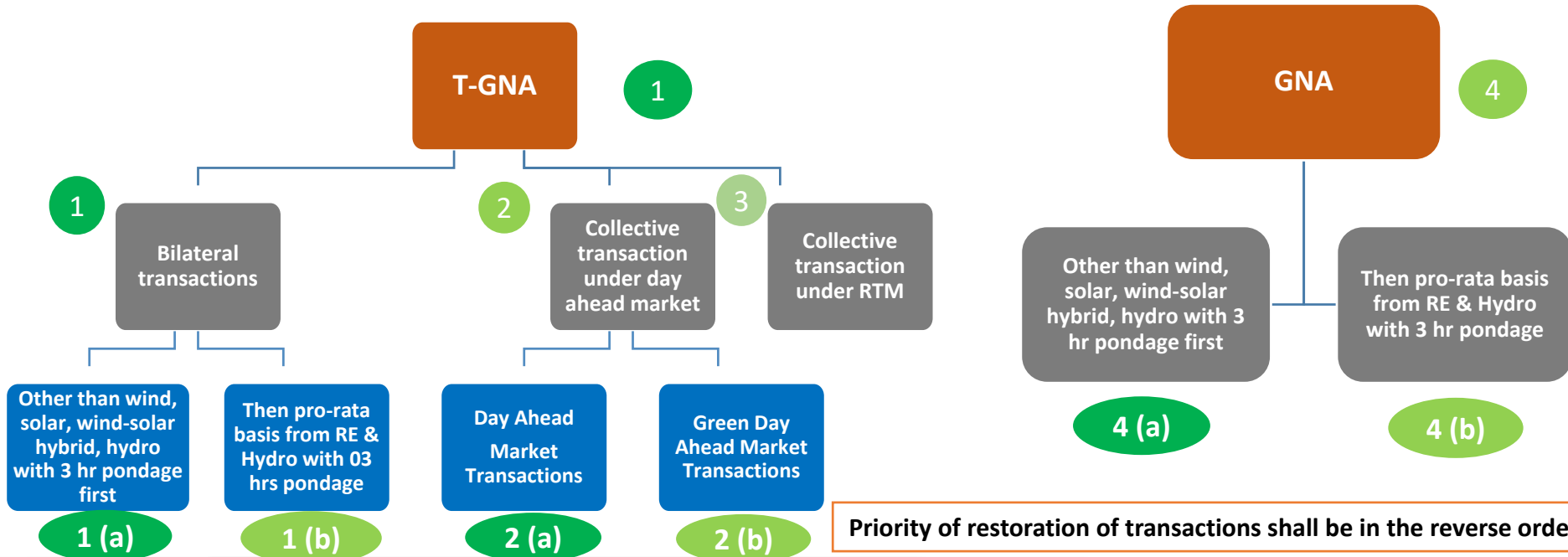
Procedure for approval and facilitating Import/Export (Cross Border) of Electricity by the Designated Authority

CERC Cross Border Trade of Electricity) Regulations, 2019

Central Electricity Regulatory Commission (Connectivity and General Network Access to the inter-State transmission System) Regulations, 2022

# Schedule Curtailment under GNA & T-GNA

- NLDC/RLDC/SLDC may curtail the power flow on a transmission corridor and same shall become effective from 4<sup>th</sup> time block for any revision in schedule made in odd or even time blocks respectively subjected to:
  - i. **Threat to Grid Security**
  - ii. **Transmission constraint in neighboring country**
  
- Schedule curtailment would be effective in the following sequence :



## Revision in case of “Forced Outage” or “GD-5” Disturbance

- Scheduled transactions can be revised in case of **forced outage of 100 MW & above unit**
- In case of any disturbance of **GD-5 category**, scheduled generation of all the affected regional entity generating stations shall be deemed to have been revised to their actual generation for all affected time blocks
- In case the beneficiaries or buyers of such regional entity generating station are also affected, scheduled draws of such beneficiaries or buyers shall be deemed to have been revised to corresponding actual generation schedule. If not affected, no revision in drawl schedule
- The scheduled generation of all the affected regional entity generating stations supplying power under collective transactions drawl schedule of buyers from such regional entity generation shall be deemed to have been revised to their corresponding actual generation
- The declaration of grid disturbance shall be done by the concerned RLDC at the earliest with a notice on its website
- The generation and drawl schedules revised by the RLDC shall become effective from 4<sup>th</sup> time block depending on the block in which the schedule has been revised as first block

# Thank you !!



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