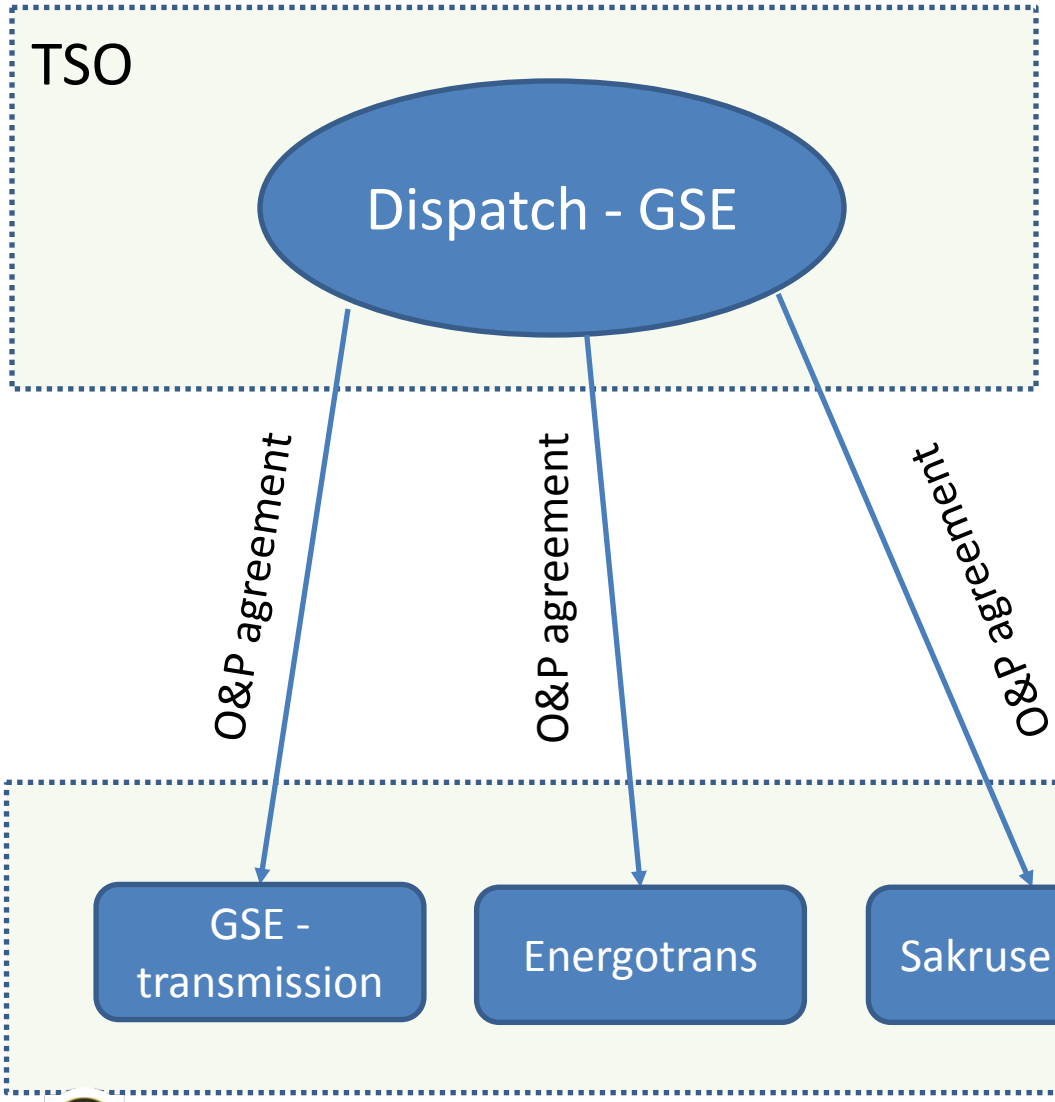
Rules and Procedures for Connection to Transmission Network (Connection stages, procedures and term) (Georgia)

REGULATION FOR DEVELOPMENT

Content

- Legal Framework
- Procedures
- Proposal on Connection
- Technical Requirements on Connection Point
- Templates for the Connection to the Transmission Network
- Standard Connection Scheme
- Prerequisites for Determining Connection Fees

Transmission System Model



Three Transmission Licensees:

- GSE
- Energotrans
- Sakrusenergo

One Dispatch Licensee:

- GSE

Legal Framework

- Network Code
  - **Chapter 2**. Connection Code:
    - ✓ Determination of fair and nondiscriminatory rule for the connection to the transmission network
    - ✓ Determination of standards for proper functioning of transmission network

Scope

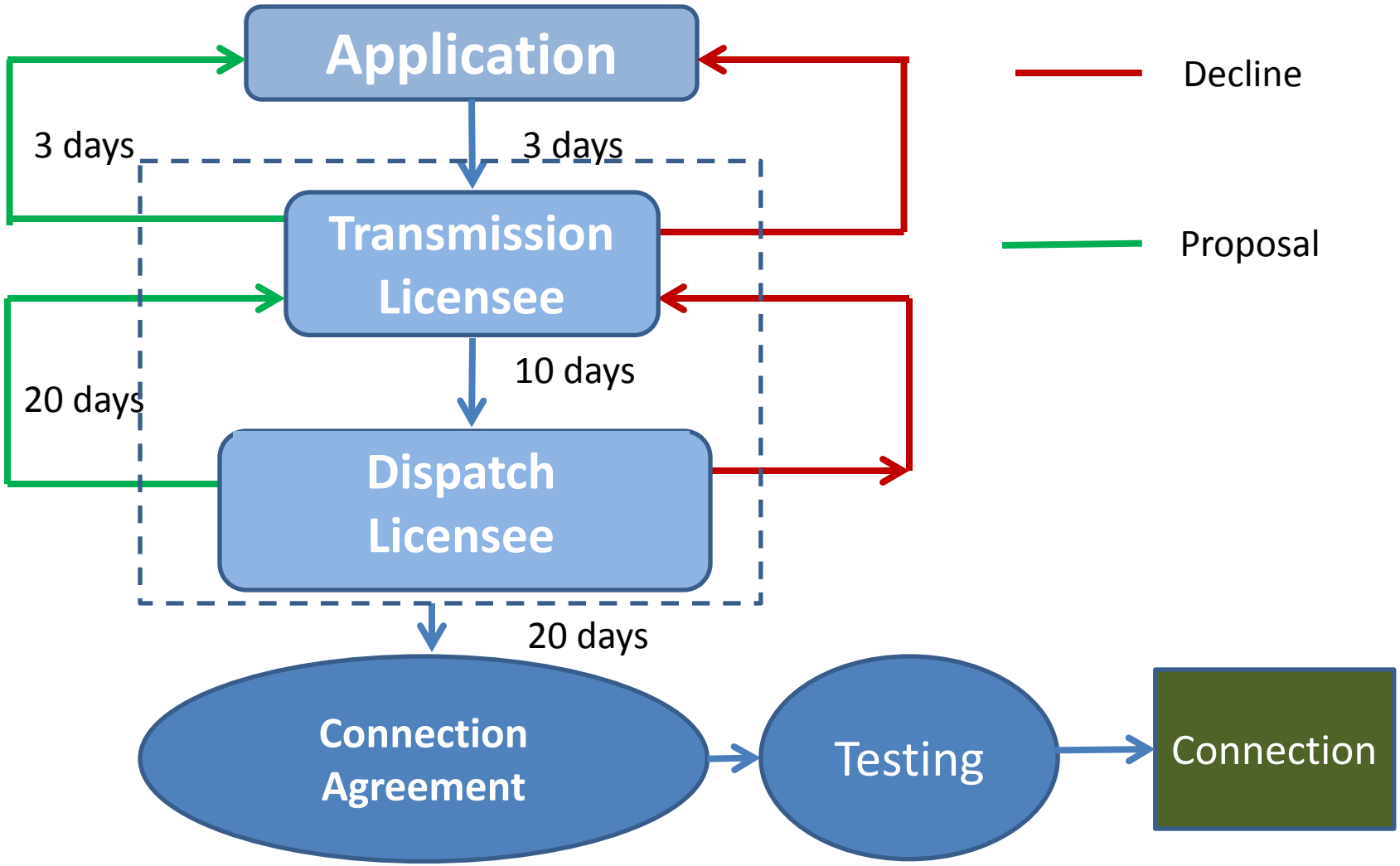
- Dispatch licensee
- Transmission licensee
- Market operator
- Generators
- Distribution licensee
- Directly connected consumers
- Other Consumers

Grid Users

System Participants

- **Applicants for new connection**

Procedures


Application
3 days
3 days
Transmission Licensee
10 days
20 days
Dispatch Licensee
20 days
Connection Agreement
Testing
Connection
Decline
Proposal

Application

- Information on connection type (new, modification)
- Required connection voltage level
- Connection active capacity
- Planned reactive capacity consumption or power factor
- Designed consumption/generation per year
- Load types of connection facility
- The desirable date of the connection
- Expected daily load schedule
- Documents proving the ownership of connection facility
- Single-line electrical circuit

Proposal on Connection

- Terms of Reference
- Connection date and period
- Draft of Connection Agreement
- Connection Fee

Frequency Limits

- In synchronous mode:
  - f=50±0,5 Hz (95% per day)
- In isolated mode:
  - f=50±1 Hz (95% per day)
- In the post-emergency standby mode:

f=49.0-50.5 (Extensive running time)
f=48.0-49.0 (no more than 15 minutes)
f=47.5-48.0 (no more than 2 minutes)
f=50.5-51.0 (no more than 20 minutes)

Voltage Limits

- In Normal mode

Nominal Voltage (kV)	35	110	220	330	400	500
Allowed limits	± 10%		± 5%			

- In the post-emergency mode:

Nominal Voltage (kV)	35	110	220	330	400	500
Allowed limits	± 15%		± 10%			

Capacity factor

- For power plants:

Name	cosf
TPP	0.85-0.90
HPP	0.80-0.85

- For power plants and distribution licensees:

No less than 85 %

Quality Requirements

- Voltage unbalance – no more then 1%
- Voltage Fluctuation – no mere then 1%
- Flicker – P_{st}=0.8; P_{lt}=0.6
- Harmonic distortion – total = 1.5%; Ind = 1%
- Grounding – Ground fault factor=1.4

Requirements for Generators:

- Fitted with speed governors and participating in frequency regulation
- Fitted with automatic voltage regulators
- Rapid acting excitation system
- Black start capability
- house load operation capability (Only for HPPs)

Requirements for Hydro Generators:

Category	Capacity range	Voltage regulation	Reliability requirement	Frequency regulation		Black start
				Primary	Secondary	
A	<1	-	-	-	-	-
B	1 - <5	+	+	-	-	negotiable
C	5 - <7	+	+	negotiable	-	+
D	≥7	+	+	+	negotiable	+

Requirements for Thermal Generators:

Category	Capacity range	Voltage regulation	Reliability requirement	Frequency regulation		Black start
				Primary	Secondary	
A	<10	-	-	-	-	-
B	10 - <30	+	-	-	-	-
C	30 - <50	+	+	-	-	+
D	≥50	+	+	+	negotiable	negotiable

List of additional templates and documents

Transmission network connection application template

- Developed by TSO and approved by the commission

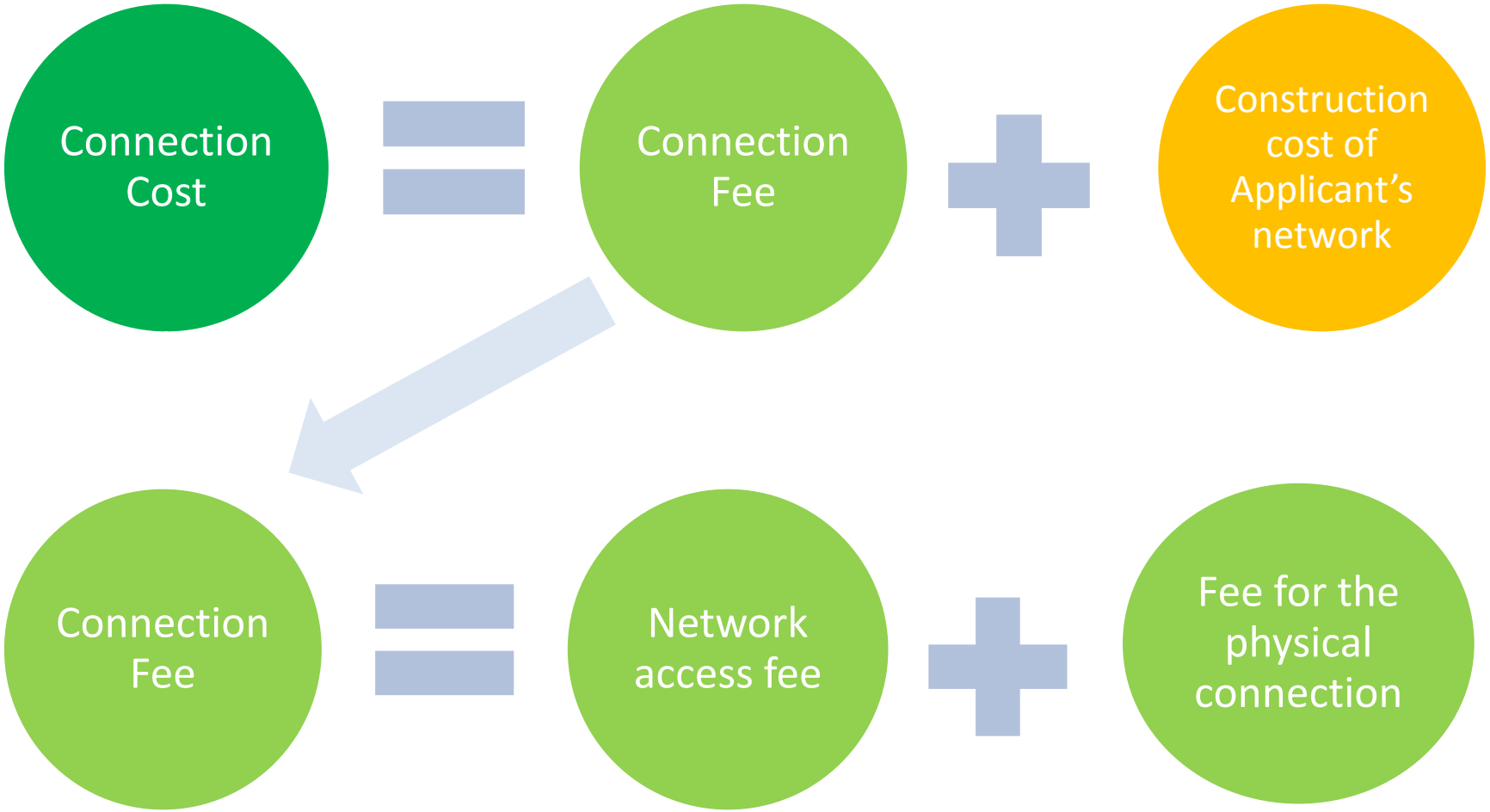
Transmission network connection agreement template

- Developed by TSO and presented to the Commission for approval

Transmission network connection charge methodology

- To be Developed and approved by the Commission

Connection Cost Concept



Connection Cost

Network access fee

- Review and agreement of application
- The survey of the network
  - ➢ Draft agreement on connection
  - ➢ Internal ToR
  - ➢ External ToR
  - ➢ Goals of the connection

- Participation in the testing of connection facility and drawing up the act.

Connection Fee

The average asset cost which stays under TSO ownership on relevant voltage level, including:

- Network cell at Connection point;
- Metering point (meters, metering transformers etc.)
- Electricity line – tie-in or branch line and corresponding switching devices.

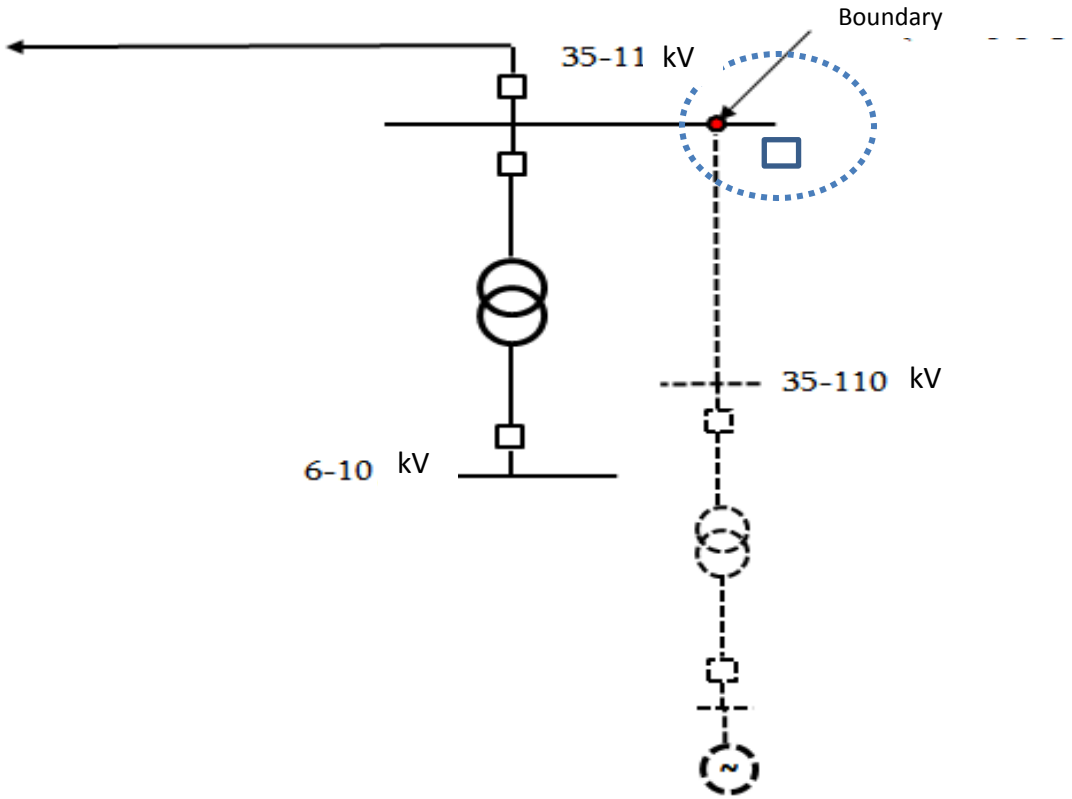
Construction cost of Applicant's network

Applicant is a person willing to connect to the transmission network. Applicant provides construction of network till the connection point with its own assets according to the technical conditions issued by the TSO.

With the agreement of applicant the TSO may construct the network. In other case the applicant may hire another person with respective competences.

Standard Connection Scheme (1/3)

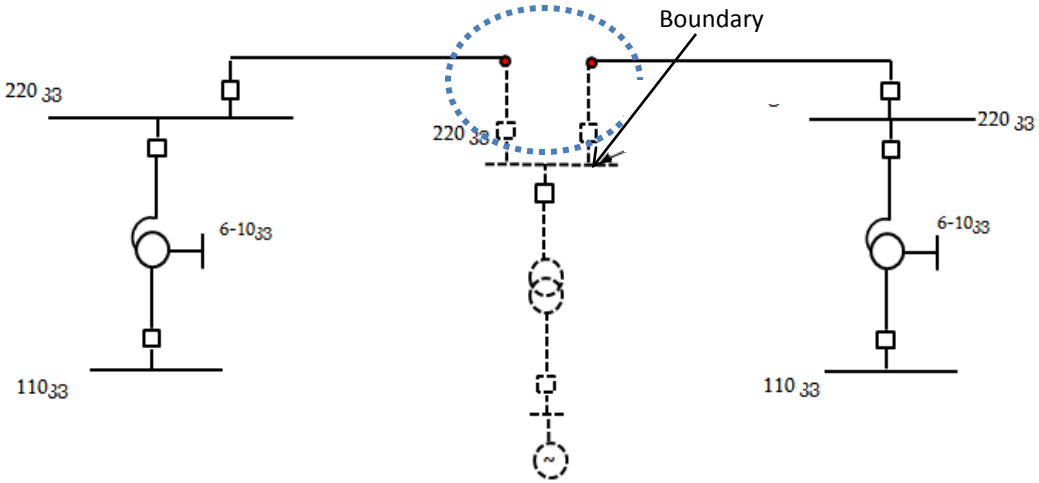
- Connection at network cell of electricity line substation:



- Standard connection fee = Cell cost + Metering point cost

Standard Connection Scheme (2/3)

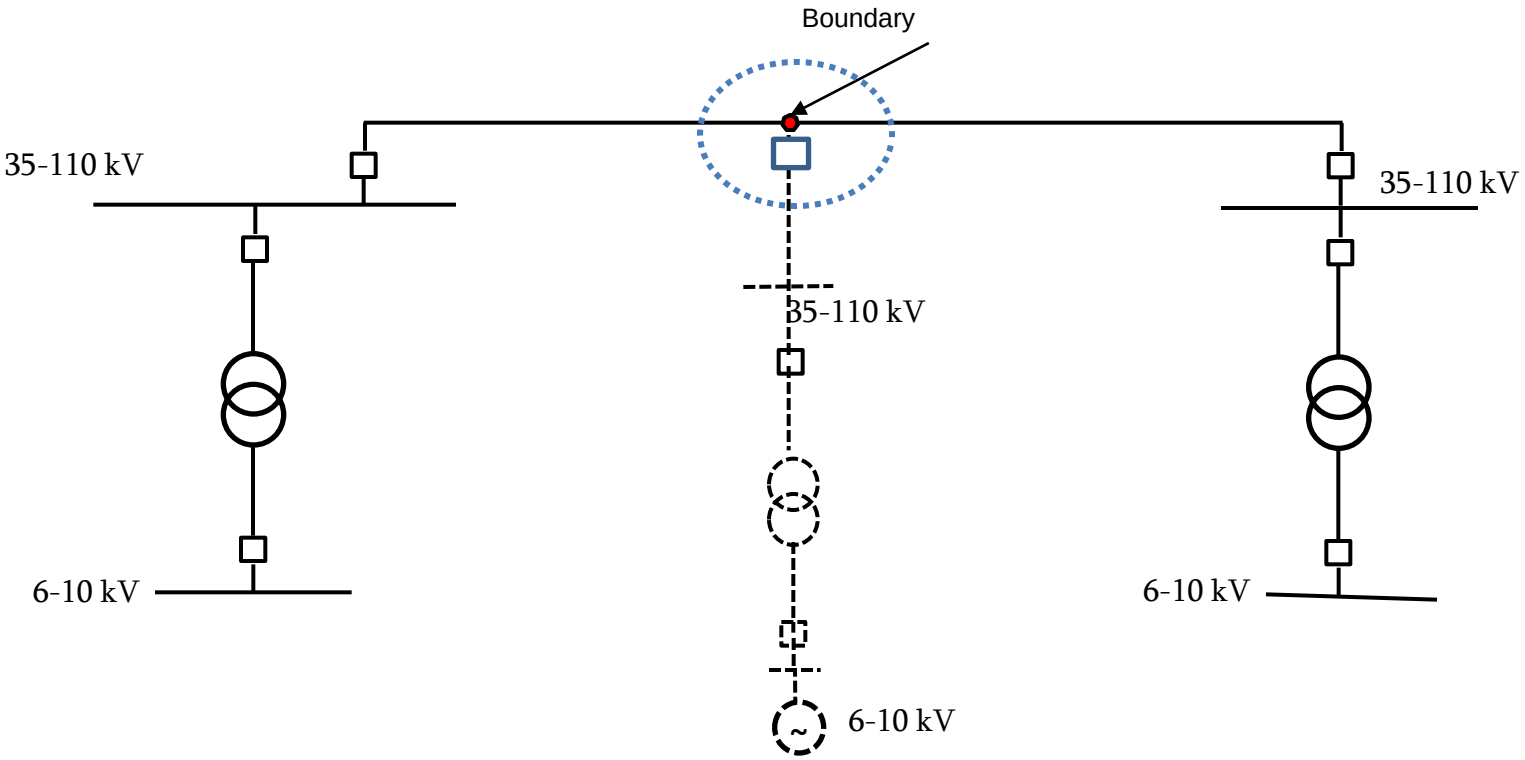
Cut-in in electricity line of Transmission licensee



- Standard connection fee = Cost of 1 km of electricity line X cut-in length + Cost of switching devices to restore integrity of electricity line ;

Standard Connection Scheme (3/3)

Branch line



- Branching from power lines– «branch line»
- Standard connection fee = Cost of 1 km of electricity line X branch line length + Cost of switching devices to restore integrity of electricity line

Thank You!