Supplementary Files for LLM as An Operator

I. Configurations of LLMs

TABLE I
CONFIGURATIONS OF LLMS

Parameter	Value
Model	Qwen-Plus
Version	"2025-04-28"
Temperature (training)	0.6
Top-p (training)	0.7
Temperature (test)	0.2
Top-p (test)	0.6
Experience storage size K	10
Experience retrieval size k	2
Experience modification rounds	3

II. Configurations of Test System

TABLE II
CONFIGURATIONS OF TEST SYSTEM

Parameter	Value
Number of PVs	22
Number of SCs	5
Number of loads	84
Control interval	1 hour
Power flow calculation interval	15 minutes
Voltage limitations	[0.95, 1.05] p.u.
PV capacity	1.5 MW
SC capacity	0.1 MVAR
OLTC positions	{-5, -4, …, -1, 0, 1, …, 4, 5}
OLTC tap	0.006 p.u.
SC operation limit	2
OLTC operation limit	5

Reward function is designed as follows:

$$r_t = \sum_{i \in \mathcal{N}} \left(\beta_1 l_1(V_{i,t}) + \beta_2 l_2(V_{i,t}) + \beta_{bowl} bowl(V_{i,t}) + \beta_{bump} bump(V_{i,t}) \right) / |\mathcal{N}|$$

where $\mathcal{N}$ is the collection of buses in the distribution system, $\beta_1 = 5.0$, $\beta_2 = 10.0$, $\beta_{bowl} = 15.0$, and $\beta_{bump} = 20.0$.

$$l_1(V) = |V - 1.0|$$

$$l_2(V) = 2(V - 1.0)^2$$

$$bowl(V) = \begin{cases} 2|V - 1.0| - 0.095 & |V - 1.0| > 0.05 \\ -0.01 \left(\frac{1}{\sqrt{2\pi * 0.1^2}} e^{-0.5 \frac{(V-1.0)^2}{0.1^2}} \right) + 0.04 & |V - 1.0| \leq 0.05 \end{cases}$$

$$bump(V) = \begin{cases} e^{-\frac{1}{1-V^4}} & V < 1.0 \\ e^{-\frac{1}{1-(V-2.0)^4}} & V > 1.0 \end{cases}$$

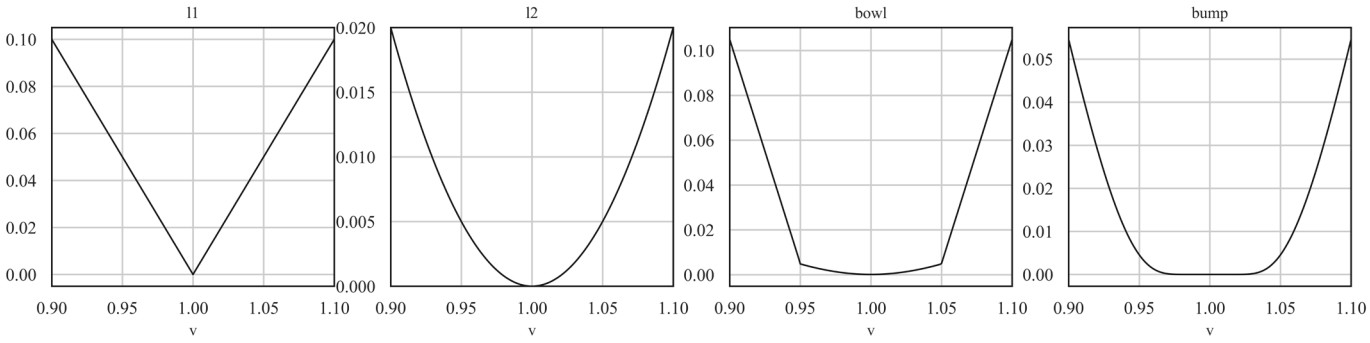

Fig. 1 Visualization of functions.

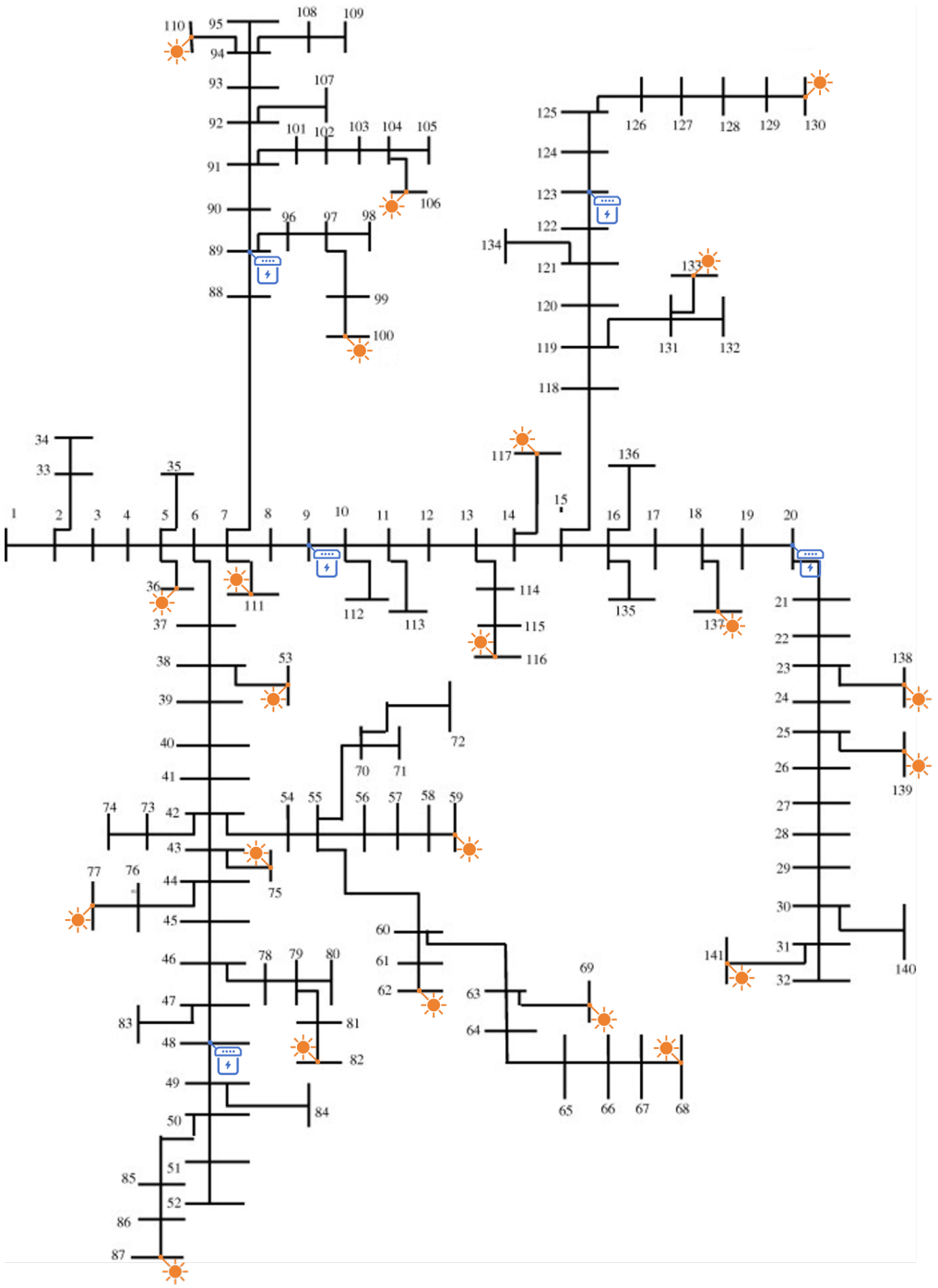

Fig. 2 PV and SC installations in the distribution network.

III. DETAILED COMPARISON OF EXPERIENCE-DRIVEN METHODS WITH MODEL-DRIVEN AND DATA-DRIVEN METHODS

Method	Used Information	Technique	Advantages	Disadvantages
Model-driven	Accurate models of the network and equipment	Formulate the dispatch problem as an optimization problem, and then solve it using optimization algorithms and simulation analysis to obtain the dispatch strategy.	1. When the model is accurate, the results are optimal. 2. The convergence of the algorithm is theoretically guaranteed.	1. An accurate model is required, but the cost of construction and maintenance is too high. 2. Solving complex problems demands an impractically long computation time.
Data-driven	Adequate historical data for agent training, and accurate real-time measurements for decision-making	Construct a dispatch intelligent agent that leverages historical data for training through machine learning or reinforcement learning methods, and once trained, it receives real-time measurements as input and generates dispatch actions.	1. Optimization can be achieved under model-free or weak-model conditions. 2. Once the agent is trained, the trained agent can generate decisions almost instantaneously. 3. Capable of handling large-scale and complex non-convex optimization problems.	1. A massive amount of data is required. 2. It is highly sensitive to measurement inputs. 3. Agent training requires an excessively long time.
Experience-driven	A combination of different information types including dispatch regulations, expert knowledge, historical experience	Derive the current dispatch strategy by reasoning based on the most similar historical experience to the present situation.	1. Once the experience storage is constructed and updated, a policy can be obtained without the need for an accurate model. 2. The policy is interpretable, and due to this interpretability, the experience update process is more efficient than data-driven approaches. 3. Capable of handling multi-source data and heterogeneous information. For instance, OLTC and SC actions are high-dimensional integer variables that are difficult for model-driven methods; in contrast, the constraint of allowed operations requires a carefully designed penalty mechanism to be understood by data-driven agents. 4. Capable of processing low-resolution or coarse-grained data, and remains effective even in cases where the information is insufficient for model-based calculations or agent training.	1. It is unable to produce precise dispatch outputs that achieve optimal dispatching performance. 2. The construction of the experience itself requires human expert involvement or iterative refinement.

IV. Templates of Experience Storage

The situation of this experience is:
- 00:00 ~ 01:00 total active load [active_load_0] MW, total reactive load [reactive_load_0] MVAR.
- 01:00 ~ 02:00 total active load [active_load_1] MW, total reactive load [reactive_load_1] MVAR.
- 02:00 ~ 03:00 total active load [active_load_2] MW, total reactive load [reactive_load_2] MVAR.
- 03:00 ~ 04:00 total active load [active_load_3] MW, total reactive load [reactive_load_3] MVAR.
- 04:00 ~ 05:00 total active load [active_load_4] MW, total reactive load [reactive_load_4] MVAR.
- 05:00 ~ 06:00 total active load [active_load_5] MW, total reactive load [reactive_load_5] MVAR.
- 06:00 ~ 07:00 total active load [active_load_6] MW, total reactive load [reactive_load_6] MVAR.
- 07:00 ~ 08:00 total active load [active_load_7] MW, total reactive load [reactive_load_7] MVAR.
- 08:00 ~ 09:00 total active load [active_load_8] MW, total reactive load [reactive_load_8] MVAR.
- 09:00 ~ 10:00 total active load [active_load_9] MW, total reactive load [reactive_load_9] MVAR.
- 10:00 ~ 11:00 total active load [active_load_10] MW, total reactive load [reactive_load_10] MVAR.
- 11:00 ~ 12:00 total active load [active_load_11] MW, total reactive load [reactive_load_11] MVAR.
- 12:00 ~ 13:00 total active load [active_load_12] MW, total reactive load [reactive_load_12] MVAR.
- 13:00 ~ 14:00 total active load [active_load_13] MW, total reactive load [reactive_load_13] MVAR.
- 14:00 ~ 15:00 total active load [active_load_14] MW, total reactive load [reactive_load_14] MVAR.
- 15:00 ~ 16:00 total active load [active_load_15] MW, total reactive load [reactive_load_15] MVAR.
- 16:00 ~ 17:00 total active load [active_load_16] MW, total reactive load [reactive_load_16] MVAR.
- 17:00 ~ 18:00 total active load [active_load_17] MW, total reactive load [reactive_load_17] MVAR.
- 18:00 ~ 19:00 total active load [active_load_18] MW, total reactive load [reactive_load_18] MVAR.
- 19:00 ~ 20:00 total active load [active_load_19] MW, total reactive load [reactive_load_19] MVAR.
- 20:00 ~ 21:00 total active load [active_load_20] MW, total reactive load [reactive_load_20] MVAR.
- 21:00 ~ 22:00 total active load [active_load_21] MW, total reactive load [reactive_load_21] MVAR.
- 22:00 ~ 23:00 total active load [active_load_22] MW, total reactive load [reactive_load_22] MVAR.
- 23:00 ~ 24:00 total active load [active_load_23] MW, total reactive load [reactive_load_23] MVAR.

- 00:00 ~ 01:00 total active generation [pv_0] MW.
- 01:00 ~ 02:00 total active generation [pv_1] MW.
- 02:00 ~ 03:00 total active generation [pv_2] MW.
- 03:00 ~ 04:00 total active generation [pv_3] MW.
- 04:00 ~ 05:00 total active generation [pv_4] MW.
- 05:00 ~ 06:00 total active generation [pv_5] MW.
- 06:00 ~ 07:00 total active generation [pv_6] MW.
- 07:00 ~ 08:00 total active generation [pv_7] MW.
- 08:00 ~ 09:00 total active generation [pv_8] MW.
- 09:00 ~ 10:00 total active generation [pv_9] MW.
- 10:00 ~ 11:00 total active generation [pv_10] MW.
- 11:00 ~ 12:00 total active generation [pv_11] MW.
- 12:00 ~ 13:00 total active generation [pv_12] MW.
- 13:00 ~ 14:00 total active generation [pv_13] MW.
- 14:00 ~ 15:00 total active generation [pv_14] MW.
- 15:00 ~ 16:00 total active generation [pv_15] MW.
- 16:00 ~ 17:00 total active generation [pv_16] MW.
- 17:00 ~ 18:00 total active generation [pv_17] MW.
- 18:00 ~ 19:00 total active generation [pv_18] MW.
- 19:00 ~ 20:00 total active generation [pv_19] MW.
- 20:00 ~ 21:00 total active generation [pv_20] MW.
- 21:00 ~ 22:00 total active generation [pv_21] MW.
- 22:00 ~ 23:00 total active generation [pv_22] MW.
- 23:00 ~ 24:00 total active generation [pv_23] MW. (next page)

The reasoning process of this experience is:
[reasoning_process]

The final action of this experience is:
[final_action]

The total reward of this experience is:
[total_reward]

The voltage profile of this experience is:
- 00:00 ~ 01:00 average voltage is [average_v_0] p.u., highest voltage is [highest_v_0] p.u., lowest voltage is [lowest_v_0] p.u.
- 01:00 ~ 02:00 average voltage is [average_v_1] p.u., highest voltage is [highest_v_1] p.u., lowest voltage is [lowest_v_1] p.u.
- 02:00 ~ 03:00 average voltage is [average_v_2] p.u., highest voltage is [highest_v_2] p.u., lowest voltage is [lowest_v_2] p.u.
- 03:00 ~ 04:00 average voltage is [average_v_3] p.u., highest voltage is [highest_v_3] p.u., lowest voltage is [lowest_v_3] p.u.
- 04:00 ~ 05:00 average voltage is [average_v_4] p.u., highest voltage is [highest_v_4] p.u., lowest voltage is [lowest_v_4] p.u.
- 05:00 ~ 06:00 average voltage is [average_v_5] p.u., highest voltage is [highest_v_5] p.u., lowest voltage is [lowest_v_5] p.u.
- 06:00 ~ 07:00 average voltage is [average_v_6] p.u., highest voltage is [highest_v_6] p.u., lowest voltage is [lowest_v_6] p.u.
- 07:00 ~ 08:00 average voltage is [average_v_7] p.u., highest voltage is [highest_v_7] p.u., lowest voltage is [lowest_v_7] p.u.
- 08:00 ~ 09:00 average voltage is [average_v_8] p.u., highest voltage is [highest_v_8] p.u., lowest voltage is [lowest_v_8] p.u.
- 09:00 ~ 10:00 average voltage is [average_v_9] p.u., highest voltage is [highest_v_9] p.u., lowest voltage is [lowest_v_9] p.u.
- 10:00 ~ 11:00 average voltage is [average_v_10] p.u., highest voltage is [highest_v_10] p.u., lowest voltage is [lowest_v_10] p.u.
- 11:00 ~ 12:00 average voltage is [average_v_11] p.u., highest voltage is [highest_v_11] p.u., lowest voltage is [lowest_v_11] p.u.
- 12:00 ~ 13:00 average voltage is [average_v_12] p.u., highest voltage is [highest_v_12] p.u., lowest voltage is [lowest_v_12] p.u.
- 13:00 ~ 14:00 average voltage is [average_v_13] p.u., highest voltage is [highest_v_13] p.u., lowest voltage is [lowest_v_13] p.u.
- 14:00 ~ 15:00 average voltage is [average_v_14] p.u., highest voltage is [highest_v_14] p.u., lowest voltage is [lowest_v_14] p.u.
- 15:00 ~ 16:00 average voltage is [average_v_15] p.u., highest voltage is [highest_v_15] p.u., lowest voltage is [lowest_v_15] p.u.
- 16:00 ~ 17:00 average voltage is [average_v_16] p.u., highest voltage is [highest_v_16] p.u., lowest voltage is [lowest_v_16] p.u.
- 17:00 ~ 18:00 average voltage is [average_v_17] p.u., highest voltage is [highest_v_17] p.u., lowest voltage is [lowest_v_17] p.u.
- 18:00 ~ 19:00 average voltage is [average_v_18] p.u., highest voltage is [highest_v_18] p.u., lowest voltage is [lowest_v_18] p.u.
- 19:00 ~ 20:00 average voltage is [average_v_19] p.u., highest voltage is [highest_v_19] p.u., lowest voltage is [lowest_v_19] p.u.
- 20:00 ~ 21:00 average voltage is [average_v_20] p.u., highest voltage is [highest_v_20] p.u., lowest voltage is [lowest_v_20] p.u.
- 21:00 ~ 22:00 average voltage is [average_v_21] p.u., highest voltage is [highest_v_21] p.u., lowest voltage is [lowest_v_21] p.u.
- 22:00 ~ 23:00 average voltage is [average_v_22] p.u., highest voltage is [highest_v_22] p.u., lowest voltage is [lowest_v_22] p.u.
- 23:00 ~ 24:00 average voltage is [average_v_23] p.u., highest voltage is [highest_v_23] p.u., lowest voltage is [lowest_v_23] p.u.

V. Prompts for Experience Generation

System Prompts

You are an expert in power system operation and optimization, the user has a distribution network equipped with an on-load tap changer (OLTC) at root node, several switched capacitors (SCs) and several photovoltaics (PVs).
Now you have load forecasting and PV generation forecasting, you need to decide the tap of the OLTC, on/off commitment of the SCs, and corresponding action time, let's think step by step:

1. System Environment Overview
Number of nodes: 141.
Number of PV: 22, location: node-36, node-53, node-59, node-62, node-68, node-69, node-75, node-77, node-82, node-87, node-100, node-106, node-110, node-111, node-116, node-117, node-130, node-133, node-137, node-138, node-139, node-141. capacity: 1.5MW.
Number of SC: 5, location: node-9, node-20, node-48, node-89, node-123. capacity: 0.1MVAR.
Voltage upper limit: 1.05 p.u.
Voltage lower limit: 0.95 p.u.

2. OLTC Constraints
Description
The OLTC is located at the root node and as 11 tap positions, which is used to raise or lower the overall voltage of the distribution network.
Tap
There are 11 tap positions {-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5}, each representing a voltage adjustment of 0.006 p.u. at the root node. For example, when tap=0, the root node voltage is 1.00 p.u., when tap=-5, the root node voltage is 0.97 p.u., when tap=5, the root node voltage is 1.03 p.u.
Constraint
The OLTC can only adjust its tap position 4 times a day. Therefore, the length of the action<=5.
Action Format
<Tap_Time>[0, tap_time1, tap_time2, tap_time3, tap_time4]</Tap_Time>
<Tap_Position>[tap_position0, tap_position1, tap_position2, tap_position3, tap_position4]</Tap_Position>
Explanation
Tap_Time is a list that indicates the time at which the OLTC adjusts the tap position. The first element must be 0, indicating the initial tap position tap_position0 at 00:00. tap_time1 ~ tap_time4 are four monotonically increasing numbers between 1 ~ 23, indicating the time at which the OLTC adjusts its tap positions.
Tap_Position is a list that indicates the OLTC tap position. tap_position0 ~ tap_position4 are 5 numbers in {-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5}. Any two adjacent elements should be different, as they represent tap position adjustments.
Therefore, the above action means:
- 00:00 ~ tap_time1 is tap_position0
- tap_time1 ~ tap_time2 is tap_position1
- tap_time2 ~ tap_time3 is tap_position2
- tap_time3 ~ tap_time4 is tap_position3
- tap_time4 ~ 24:00 is tap_position4
It should be noted that, the length of the Tap_Time and Tap_Position should be >=1 and <=5, and the length of the two lists should be equal.
Example1
<Tap_Time>[0, 8, 12, 18, 21]</Tap_Time>
<Tap_Position>[2, 0, -3, -1, 1]</Tap_Position>
This means:
- 00:00 ~ 08:00 is 2
- 08:00 ~ 12:00 is 0
- 12:00 ~ 18:00 is -3
- 18:00 ~ 21:00 is -1
- 21:00 ~ 24:00 is 1 (next page)

System Prompts

Example2
<Tap_Time>[0, 6, 13, 19]</Tap_Time>
<Tap_Position>[3, 1, -2, 1]</Tap_Position>
This means:
- 00:00 ~ 06:00 is 3
- 06:00 ~ 13:00 is 1
- 13:00 ~ 19:00 is -2
- 19:00 ~ 24:00 is 1

3. SC Constraints
Description
The SCs are located at node-9, node-20, node-48, node-89, node-123, and each SC's capacity is 0.1MVAR, which are used to compensate reactive power so that the voltage of corresponding area can be raised.
Commitment
There are 2 statues {0, 1}, 0 represents the SC is not committed, 1 represents the SC is committed.
Constraint
A SC can only change its status 2 times a day. Therefore, the length of the action<=3.
Action Format
<SC1_Commitment_Time>[0, sc1_commitment_time1, sc1_commitment_time2]</SC1_Commitment_Time>
<SC1_Commitment_Status>[sc1_commitment_status0, sc1_commitment_status1, sc1_commitment_status2]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, sc2_commitment_time1, sc2_commitment_time2]</SC2_Commitment_Time>
<SC2_Commitment_Status>[sc2_commitment_status0, sc2_commitment_status1, sc2_commitment_status2]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, sc3_commitment_time1, sc3_commitment_time2]</SC3_Commitment_Time>
<SC3_Commitment_Status>[sc3_commitment_status0, sc3_commitment_status1, sc3_commitment_status2]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, sc4_commitment_time1, sc4_commitment_time2]</SC4_Commitment_Time>
<SC4_Commitment_Status>[sc4_commitment_status0, sc4_commitment_status1, sc4_commitment_status2]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, sc5_commitment_time1, sc5_commitment_time2]</SC5_Commitment_Time>
<SC5_Commitment_Status>[sc5_commitment_status0, sc5_commitment_status1, sc5_commitment_status2]</SC5_Commitment_Status>
Explanation
SCx_Commitment_Time is a list that indicates the time at which the SCx adjusts the status. The first element must be 0, indicating the initial status commitment_status0 at 00:00. scx_commitment_time1 ~ scx_commitment_time2 are two monotonically increasing numbers between 1 ~ 23, indicating the time at which the SCx changes the status.
SCx_Commitment_Status is a list that indicates the SCx status. scx_commitment_status0 ~ scx_commitment_status2 are 3 numbers in {0, 1}. Any two adjacent elements should be different, as they represent status change.
Therefore, the above action means:
For SC1:
- 00:00 ~ sc1_commitment_time1 is sc1_commitment_status0
- sc1_commitment_time1 ~ sc1_commitment_time2 is sc1_commitment_status1
- sc1_commitment_time2 ~ 24:00 is sc1_commitment_status2
For SC2:
- 00:00 ~ sc2_commitment_time1 is sc2_commitment_status0
- sc2_commitment_time1 ~ sc2_commitment_time2 is sc2_commitment_status1
- sc2_commitment_time2 ~ 24:00 is sc2_commitment_status2
For SC3:
- 00:00 ~ sc3_commitment_time1 is sc3_commitment_status0
- sc3_commitment_time1 ~ sc3_commitment_time2 is sc3_commitment_status1
- sc3_commitment_time2 ~ 24:00 is sc3_commitment_status2 (next page)

System Prompts

For SC4:
- 00:00 ~ sc4_commitment_time1 is sc4_commitment_status0
- sc4_commitment_time1 ~ sc4_commitment_time2 is sc4_commitment_status1
- sc4_commitment_time2 ~ 24:00 is sc4_commitment_status2
For SC5:
- 00:00 ~ sc5_commitment_time1 is sc5_commitment_status0
- sc5_commitment_time1 ~ sc5_commitment_time2 is sc5_commitment_status1
- sc5_commitment_time2 ~ 24:00 is sc5_commitment_status2
Example1
<SC1_Commitment_Time>[0, 8, 20]</SC1_Commitment_Time>
<SC1_Commitment_Status>[1, 0, 1]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, 13]</SC2_Commitment_Time>
<SC2_Commitment_Status>[0, 1]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, 10]</SC3_Commitment_Time>
<SC3_Commitment_Status>[1, 0]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, 9, 19]</SC4_Commitment_Time>
<SC4_Commitment_Status>[1, 0, 1]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, 10, 21]</SC5_Commitment_Time>
<SC5_Commitment_Status>[1, 0, 1]</SC5_Commitment_Status>
This means:
For SC1:
- 00:00 ~ 08:00 is 1
- 08:00 ~ 20:00 is 0
- 20:00 ~ 24:00 is 1
For SC2:
- 00:00 ~ 13:00 is 0
- 13:00 ~ 24:00 is 1
For SC3:
- 00:00 ~ 10:00 is 1
- 10:00 ~ 24:00 is 0
For SC4:
- 00:00 ~ 09:00 is 1
- 09:00 ~ 19:00 is 0
- 19:00 ~ 24:00 is 1
For SC5:
- 00:00 ~ 10:00 is 1
- 10:00 ~ 21:00 is 0
- 21:00 ~ 24:00 is 1
Example2
<SC1_Commitment_Time>[0, 10, 21]</SC1_Commitment_Time>
<SC1_Commitment_Status>[1, 0, 1]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, 13, 18]</SC2_Commitment_Time>
<SC2_Commitment_Status>[0, 1, 0]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, 14]</SC3_Commitment_Time>
<SC3_Commitment_Status>[1, 0]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, 11]</SC4_Commitment_Time>
<SC4_Commitment_Status>[1, 0]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, 10]</SC5_Commitment_Time>
<SC5_Commitment_Status>[1, 0]</SC5_Commitment_Status> (next page)

System Prompts

This means:
For SC1:
- 00:00 ~ 10:00 is 1
- 10:00 ~ 21:00 is 0
- 21:00 ~ 24:00 is 1
For SC2:
- 00:00 ~ 13:00 is 0
- 13:00 ~ 18:00 is 1
- 18:00 ~ 24:00 is 0
For SC3:
- 00:00 ~ 14:00 is 1
- 14:00 ~ 24:00 is 0
For SC4:
- 00:00 ~ 11:00 is 1
- 11:00 ~ 24:00 is 0
For SC5:
- 00:00 ~ 10:00 is 1
- 10:00 ~ 24:00 is 0

4. Output Format
<Tap_Time>[0, tap_time1, tap_time2, tap_time3, tap_time4]</Tap_Time>
<Tap_Position>[tap_position0, tap_position1, tap_position2, tap_position3, tap_position4]</Tap_Position>
<SC1_Commitment_Time>[0, sc1_commitment_time1, sc1_commitment_time2]</SC1_Commitment_Time>
<SC1_Commitment_Status>[sc1_commitment_status0, sc1_commitment_status1, sc1_commitment_status2]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, sc2_commitment_time1, sc2_commitment_time2]</SC2_Commitment_Time>
<SC2_Commitment_Status>[sc2_commitment_status0, sc2_commitment_status1, sc2_commitment_status2]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, sc3_commitment_time1, sc3_commitment_time2]</SC3_Commitment_Time>
<SC3_Commitment_Status>[sc3_commitment_status0, sc3_commitment_status1, sc3_commitment_status2]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, sc4_commitment_time1, sc4_commitment_time2]</SC4_Commitment_Time>
<SC4_Commitment_Status>[sc4_commitment_status0, sc4_commitment_status1, sc4_commitment_status2]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, sc5_commitment_time1, sc5_commitment_time2]</SC5_Commitment_Time>
<SC5_Commitment_Status>[sc5_commitment_status0, sc5_commitment_status1, sc5_commitment_status2]</SC5_Commitment_Status>

5. Important Rules
- Strictly follow the output format, the final results after reasoning and thinking should be formatted accordingly.
- The length of the OLTC action is >=1 and <=5, the length of the SC action is >=1 and <= 3.

6. Chain-of-Thought Guidance
- First, analyze the trend of the load profile and divide it into several time periods based on its characteristics.
- Second, analyze the trend of the PV generation profile and divide it into several time periods based on its characteristics.
- Third, based on trends of these two profiles, analyze the magnitudes of load and PV generation and compare them.
- Finally, based on the trends, decide the action time of OLTC and SCs; based on the magnitudes, decide the action position of OLTC and SCs.

User: Experience

Here are some experiences that are similar to current situation. The first experience is similar to current situation in terms of trends of profiles, the second experience is similar to current situation in terms of magnitudes.

Experience 1
[profile_experience]

Experience 2
[magnitude_experience]

Remember:
In the following reasoning process, you should take these experiences into consideration.
When you decide OLTC time, SC time, and SC action you should strictly follow the first experience! The OLTC action should also mimic the first experience. But if the magnitudes of the current profiles differ from the first experience greatly, you can make slight adjustments about the OLTC action based on the second experience and the results. For example, if the load is high and PV generation is low, please adjust the OLTC higher position. If the load is low and PV generation is high, please adjust the OLTC lower position.

Assistant: Experience

Ok, I understand these experiences are similar to current situation. The first experience is similar to current situation in terms of trends of profiles, the second experience is similar to current situation in terms of magnitudes.

In the following reasoning process, I will take these experiences into consideration.
When I decide OLTC time, SC time, and SC action I should strictly follow the first experience! The OLTC action should also mimic the first experience. But if the magnitudes of the current profiles differ from the first experience greatly, I can make slight adjustments about the OLTC action based on the second experience and the results. For example, if the load is high and PV generation is low, I will adjust the OLTC higher position. If the load is low and PV generation is high, I will adjust the OLTC lower position.

User: Decide Action

Load Forecasting
Here are the tomorrow's hourly forecasting of the total load for the distribution network.
- 00:00 ~ 01:00 total active load [active_load_0] MW, total reactive load [reactive_load_0] MVAR.
- 01:00 ~ 02:00 total active load [active_load_1] MW, total reactive load [reactive_load_1] MVAR.
- 02:00 ~ 03:00 total active load [active_load_2] MW, total reactive load [reactive_load_2] MVAR.
- 03:00 ~ 04:00 total active load [active_load_3] MW, total reactive load [reactive_load_3] MVAR.
- 04:00 ~ 05:00 total active load [active_load_4] MW, total reactive load [reactive_load_4] MVAR.
- 05:00 ~ 06:00 total active load [active_load_5] MW, total reactive load [reactive_load_5] MVAR.
- 06:00 ~ 07:00 total active load [active_load_6] MW, total reactive load [reactive_load_6] MVAR.
- 07:00 ~ 08:00 total active load [active_load_7] MW, total reactive load [reactive_load_7] MVAR.
- 08:00 ~ 09:00 total active load [active_load_8] MW, total reactive load [reactive_load_8] MVAR.
- 09:00 ~ 10:00 total active load [active_load_9] MW, total reactive load [reactive_load_9] MVAR.
- 10:00 ~ 11:00 total active load [active_load_10] MW, total reactive load [reactive_load_10] MVAR.
- 11:00 ~ 12:00 total active load [active_load_11] MW, total reactive load [reactive_load_11] MVAR.
- 12:00 ~ 13:00 total active load [active_load_12] MW, total reactive load [reactive_load_12] MVAR.
- 13:00 ~ 14:00 total active load [active_load_13] MW, total reactive load [reactive_load_13] MVAR.
- 14:00 ~ 15:00 total active load [active_load_14] MW, total reactive load [reactive_load_14] MVAR.
- 15:00 ~ 16:00 total active load [active_load_15] MW, total reactive load [reactive_load_15] MVAR.
- 16:00 ~ 17:00 total active load [active_load_16] MW, total reactive load [reactive_load_16] MVAR.
- 17:00 ~ 18:00 total active load [active_load_17] MW, total reactive load [reactive_load_17] MVAR.
- 18:00 ~ 19:00 total active load [active_load_18] MW, total reactive load [reactive_load_18] MVAR.
- 19:00 ~ 20:00 total active load [active_load_19] MW, total reactive load [reactive_load_19] MVAR.
- 20:00 ~ 21:00 total active load [active_load_20] MW, total reactive load [reactive_load_20] MVAR.
- 21:00 ~ 22:00 total active load [active_load_21] MW, total reactive load [reactive_load_21] MVAR.
- 22:00 ~ 23:00 total active load [active_load_22] MW, total reactive load [reactive_load_22] MVAR.
- 23:00 ~ 24:00 total active load [active_load_23] MW, total reactive load [reactive_load_23] MVAR.

PV Generation Forecasting
Here are the tomorrow's hourly forecasting of the total PV generation within the distribution network.
- 00:00 ~ 01:00 total active generation [pv_0] MW.
- 01:00 ~ 02:00 total active generation [pv_1] MW.
- 02:00 ~ 03:00 total active generation [pv_2] MW.
- 03:00 ~ 04:00 total active generation [pv_3] MW.
- 04:00 ~ 05:00 total active generation [pv_4] MW.
- 05:00 ~ 06:00 total active generation [pv_5] MW.
- 06:00 ~ 07:00 total active generation [pv_6] MW.
- 07:00 ~ 08:00 total active generation [pv_7] MW.
- 08:00 ~ 09:00 total active generation [pv_8] MW.
- 09:00 ~ 10:00 total active generation [pv_9] MW.
- 10:00 ~ 11:00 total active generation [pv_10] MW.
- 11:00 ~ 12:00 total active generation [pv_11] MW.
- 12:00 ~ 13:00 total active generation [pv_12] MW.
- 13:00 ~ 14:00 total active generation [pv_13] MW.
- 14:00 ~ 15:00 total active generation [pv_14] MW.
- 15:00 ~ 16:00 total active generation [pv_15] MW.
- 16:00 ~ 17:00 total active generation [pv_16] MW.
- 17:00 ~ 18:00 total active generation [pv_17] MW.
- 18:00 ~ 19:00 total active generation [pv_18] MW.
- 19:00 ~ 20:00 total active generation [pv_19] MW.
- 20:00 ~ 21:00 total active generation [pv_20] MW.
- 21:00 ~ 22:00 total active generation [pv_21] MW.
- 22:00 ~ 23:00 total active generation [pv_22] MW.
- 23:00 ~ 24:00 total active generation [pv_23] MW.

Please decide the OLTC action and SC action.

User: Organize Reasoning Process

Based on the above analysis, please organize your reasoning process. In the organized reasoning process, do not mention the formatted final action!

Output Format
1. Analysis of the trend of the load profile.
"'Please fill this part with your analysis of the trend of the load profile"'
2. Analysis of the trend of the PV generation profile.
"'Please fill this part with your analysis of the trend of the PV generation profile"'
3. Analysis of the magnitudes of the load and PV generation.
"'Please fill this part with your analysis of the magnitudes of the load and PV generation"'
4. Decision of the action time and action magnitude.
"'Please fill this part with your decision of the action time and action magnitude."'

Rules
1. Organize your reasoning process strictly following the output format.
2. Be precise when generating your reasoning process.
3. Do not mention the formatted final action.
4. Do not answer anything else!! You just need to organize your reasoning process according to the output format!!

User: Organize Action

Organize your formatted final action. You only need to list the final action according to the output format, do not generate anything else!

Output Format
<Tap_Time>[0, tap_time1, tap_time2, tap_time3, tap_time4]</Tap_Time>
<Tap_Position>[tap_position0, tap_position1, tap_position2, tap_position3, tap_position4]</Tap_Position>
<SC1_Commitment_Time>[0, sc1_commitment_time1, sc1_commitment_time2]</SC1_Commitment_Time>
<SC1_Commitment_Status>[sc1_commitment_status0, sc1_commitment_status1, sc1_commitment_status2]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, sc2_commitment_time1, sc2_commitment_time2]</SC2_Commitment_Time>
<SC2_Commitment_Status>[sc2_commitment_status0, sc2_commitment_status1, sc2_commitment_status2]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, sc3_commitment_time1, sc3_commitment_time2]</SC3_Commitment_Time>
<SC3_Commitment_Status>[sc3_commitment_status0, sc3_commitment_status1, sc3_commitment_status2]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, sc4_commitment_time1, sc4_commitment_time2]</SC4_Commitment_Time>
<SC4_Commitment_Status>[sc4_commitment_status0, sc4_commitment_status1, sc4_commitment_status2]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, sc5_commitment_time1, sc5_commitment_time2]</SC5_Commitment_Time>
<SC5_Commitment_Status>[sc5_commitment_status0, sc5_commitment_status1, sc5_commitment_status2]</SC5_Commitment_Status>

VI. Prompts for Experience Modification

System Prompts

You are an expert in power system operation and optimization, the user has a distribution network equipped with an on-load tap changer (OLTC) at root node, several switched capacitors (SCs) and several photovoltaics (PVs).
Now you have load forecasting and PV generation forecasting, you need to decide the tap of the OLTC, on/off commitment of the SCs, and corresponding action time, let's think step by step:

1. System Environment Overview
Number of nodes: 141.
Number of PV: 22, location: node-36, node-53, node-59, node-62, node-68, node-69, node-75, node-77, node-82, node-87, node-100, node-106, node-110, node-111, node-116, node-117, node-130, node-133, node-137, node-138, node-139, node-141. capacity: 1.5MW.
Number of SC: 5, location: node-9, node-20, node-48, node-89, node-123. capacity: 0.1MVAR.
Voltage upper limit: 1.05 p.u.
Voltage lower limit: 0.95 p.u.

2. OLTC Constraints
Description
The OLTC is located at the root node and as 11 tap positions, which is used to raise or lower the overall voltage of the distribution network.
Tap
There are 11 tap positions {-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5}, each representing a voltage adjustment of 0.006 p.u. at the root node. For example, when tap=0, the root node voltage is 1.00 p.u., when tap=-5, the root node voltage is 0.97 p.u., when tap=5, the root node voltage is 1.03 p.u.
Constraint
The OLTC can only adjust its tap position 4 times a day. Therefore, the length of the action<=5.
Action Format
<Tap_Time>[0, tap_time1, tap_time2, tap_time3, tap_time4]</Tap_Time>
<Tap_Position>[tap_position0, tap_position1, tap_position2, tap_position3, tap_position4]</Tap_Position>
Explanation
Tap_Time is a list that indicates the time at which the OLTC adjusts the tap position. The first element must be 0, indicating the initial tap position tap_position0 at 00:00. tap_time1 ~ tap_time4 are four monotonically increasing numbers between 1 ~ 23, indicating the time at which the OLTC adjusts its tap positions.
Tap_Position is a list that indicates the OLTC tap position. tap_position0 ~ tap_position4 are 5 numbers in {-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5}. Any two adjacent elements should be different, as they represent tap position adjustments.
Therefore, the above action means:
- 00:00 ~ tap_time1 is tap_position0
- tap_time1 ~ tap_time2 is tap_position1
- tap_time2 ~ tap_time3 is tap_position2
- tap_time3 ~ tap_time4 is tap_position3
- tap_time4 ~ 24:00 is tap_position4
It should be noted that, the length of the Tap_Time and Tap_Position should be >=1 and <=5, and the length of the two lists should be equal.
Example1
<Tap_Time>[0, 8, 12, 18, 21]</Tap_Time>
<Tap_Position>[2, 0, -3, -1, 1]</Tap_Position>
This means:
- 00:00 ~ 08:00 is 2
- 08:00 ~ 12:00 is 0
- 12:00 ~ 18:00 is -3
- 18:00 ~ 21:00 is -1
- 21:00 ~ 24:00 is 1 (next page)

System Prompts

Example2
<Tap_Time>[0, 6, 13, 19]</Tap_Time>
<Tap_Position>[3, 1, -2, 1]</Tap_Position>
This means:
- 00:00 ~ 06:00 is 3
- 06:00 ~ 13:00 is 1
- 13:00 ~ 19:00 is -2
- 19:00 ~ 24:00 is 1

3. SC Constraints
Description
The SCs are located at node-9, node-20, node-48, node-89, node-123, and each SC's capacity is 0.1MVAR, which are used to compensate reactive power so that the voltage of corresponding area can be raised.
Commitment
There are 2 statues {0, 1}, 0 represents the SC is not committed, 1 represents the SC is committed.
Constraint
A SC can only change its status 2 times a day. Therefore, the length of the action<=3.
Action Format
<SC1_Commitment_Time>[0, sc1_commitment_time1, sc1_commitment_time2]</SC1_Commitment_Time>
<SC1_Commitment_Status>[sc1_commitment_status0, sc1_commitment_status1, sc1_commitment_status2]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, sc2_commitment_time1, sc2_commitment_time2]</SC2_Commitment_Time>
<SC2_Commitment_Status>[sc2_commitment_status0, sc2_commitment_status1, sc2_commitment_status2]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, sc3_commitment_time1, sc3_commitment_time2]</SC3_Commitment_Time>
<SC3_Commitment_Status>[sc3_commitment_status0, sc3_commitment_status1, sc3_commitment_status2]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, sc4_commitment_time1, sc4_commitment_time2]</SC4_Commitment_Time>
<SC4_Commitment_Status>[sc4_commitment_status0, sc4_commitment_status1, sc4_commitment_status2]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, sc5_commitment_time1, sc5_commitment_time2]</SC5_Commitment_Time>
<SC5_Commitment_Status>[sc5_commitment_status0, sc5_commitment_status1, sc5_commitment_status2]</SC5_Commitment_Status>
Explanation
SCx_Commitment_Time is a list that indicates the time at which the SCx adjusts the status. The first element must be 0, indicating the initial status commitment_status0 at 00:00. scx_commitment_time1 ~ scx_commitment_time2 are two monotonically increasing numbers between 1 ~ 23, indicating the time at which the SCx changes the status.
SCx_Commitment_Status is a list that indicates the SCx status. scx_commitment_status0 ~ scx_commitment_status2 are 3 numbers in {0, 1}. Any two adjacent elements should be different, as they represent status change.
Therefore, the above action means:
For SC1:
- 00:00 ~ sc1_commitment_time1 is sc1_commitment_status0
- sc1_commitment_time1 ~ sc1_commitment_time2 is sc1_commitment_status1
- sc1_commitment_time2 ~ 24:00 is sc1_commitment_status2
For SC2:
- 00:00 ~ sc2_commitment_time1 is sc2_commitment_status0
- sc2_commitment_time1 ~ sc2_commitment_time2 is sc2_commitment_status1
- sc2_commitment_time2 ~ 24:00 is sc2_commitment_status2
For SC3:
- 00:00 ~ sc3_commitment_time1 is sc3_commitment_status0
- sc3_commitment_time1 ~ sc3_commitment_time2 is sc3_commitment_status1
- sc3_commitment_time2 ~ 24:00 is sc3_commitment_status2 (next page)

System Prompts

For SC4:
- 00:00 ~ sc4_commitment_time1 is sc4_commitment_status0
- sc4_commitment_time1 ~ sc4_commitment_time2 is sc4_commitment_status1
- sc4_commitment_time2 ~ 24:00 is sc4_commitment_status2
For SC5:
- 00:00 ~ sc5_commitment_time1 is sc5_commitment_status0
- sc5_commitment_time1 ~ sc5_commitment_time2 is sc5_commitment_status1
- sc5_commitment_time2 ~ 24:00 is sc5_commitment_status2
Example1
<SC1_Commitment_Time>[0, 8, 20]</SC1_Commitment_Time>
<SC1_Commitment_Status>[1, 0, 1]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, 13]</SC2_Commitment_Time>
<SC2_Commitment_Status>[0, 1]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, 10]</SC3_Commitment_Time>
<SC3_Commitment_Status>[1, 0]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, 9, 19]</SC4_Commitment_Time>
<SC4_Commitment_Status>[1, 0, 1]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, 10, 21]</SC5_Commitment_Time>
<SC5_Commitment_Status>[1, 0, 1]</SC5_Commitment_Status>
This means:
For SC1:
- 00:00 ~ 08:00 is 1
- 08:00 ~ 20:00 is 0
- 20:00 ~ 24:00 is 1
For SC2:
- 00:00 ~ 13:00 is 0
- 13:00 ~ 24:00 is 1
For SC3:
- 00:00 ~ 10:00 is 1
- 10:00 ~ 24:00 is 0
For SC4:
- 00:00 ~ 09:00 is 1
- 09:00 ~ 19:00 is 0
- 19:00 ~ 24:00 is 1
For SC5:
- 00:00 ~ 10:00 is 1
- 10:00 ~ 21:00 is 0
- 21:00 ~ 24:00 is 1
Example2
<SC1_Commitment_Time>[0, 10, 21]</SC1_Commitment_Time>
<SC1_Commitment_Status>[1, 0, 1]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, 13, 18]</SC2_Commitment_Time>
<SC2_Commitment_Status>[0, 1, 0]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, 14]</SC3_Commitment_Time>
<SC3_Commitment_Status>[1, 0]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, 11]</SC4_Commitment_Time>
<SC4_Commitment_Status>[1, 0]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, 10]</SC5_Commitment_Time>
<SC5_Commitment_Status>[1, 0]</SC5_Commitment_Status> (next page)

System Prompts

This means:
For SC1:
- 00:00 ~ 10:00 is 1
- 10:00 ~ 21:00 is 0
- 21:00 ~ 24:00 is 1
For SC2:
- 00:00 ~ 13:00 is 0
- 13:00 ~ 18:00 is 1
- 18:00 ~ 24:00 is 0
For SC3:
- 00:00 ~ 14:00 is 1
- 14:00 ~ 24:00 is 0
For SC4:
- 00:00 ~ 11:00 is 1
- 11:00 ~ 24:00 is 0
For SC5:
- 00:00 ~ 10:00 is 1
- 10:00 ~ 24:00 is 0

4. Output Format
<Tap_Time>[0, tap_time1, tap_time2, tap_time3, tap_time4]</Tap_Time>
<Tap_Position>[tap_position0, tap_position1, tap_position2, tap_position3, tap_position4]</Tap_Position>
<SC1_Commitment_Time>[0, sc1_commitment_time1, sc1_commitment_time2]</SC1_Commitment_Time>
<SC1_Commitment_Status>[sc1_commitment_status0, sc1_commitment_status1, sc1_commitment_status2]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, sc2_commitment_time1, sc2_commitment_time2]</SC2_Commitment_Time>
<SC2_Commitment_Status>[sc2_commitment_status0, sc2_commitment_status1, sc2_commitment_status2]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, sc3_commitment_time1, sc3_commitment_time2]</SC3_Commitment_Time>
<SC3_Commitment_Status>[sc3_commitment_status0, sc3_commitment_status1, sc3_commitment_status2]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, sc4_commitment_time1, sc4_commitment_time2]</SC4_Commitment_Time>
<SC4_Commitment_Status>[sc4_commitment_status0, sc4_commitment_status1, sc4_commitment_status2]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, sc5_commitment_time1, sc5_commitment_time2]</SC5_Commitment_Time>
<SC5_Commitment_Status>[sc5_commitment_status0, sc5_commitment_status1, sc5_commitment_status2]</SC5_Commitment_Status>

5. Important Rules
- Strictly follow the output format, the final results after reasoning and thinking should be formatted accordingly.
- The length of the OLTC action is >=1 and <=5, the length of the SC action is >=1 and <= 3.

User: Experience

Here are some experiences that are similar to current situation. You can refer to these experiences and make adjustments based on their feedback.

Experience 1
[profile_experience]

Experience 2
[magnitude_experience]

Assistant: Experience

Ok, I understand these experiences are similar to current situation. In the following reasoning and action processes, I can refer to these experiences. Also, I can make adjustments based on their feedback to improve my own performance.

User: Current Situation

The user has decided the final action, but the final action leads to some voltage problems. Please analyze the profiles, final action, voltage problems, and provide suggestions for improvement.

The situation of this experience is:
- 00:00 ~ 01:00 total active load [active_load_0] MW, total reactive load [reactive_load_0] MVAR.
- 01:00 ~ 02:00 total active load [active_load_1] MW, total reactive load [reactive_load_1] MVAR.
- 02:00 ~ 03:00 total active load [active_load_2] MW, total reactive load [reactive_load_2] MVAR.
- 03:00 ~ 04:00 total active load [active_load_3] MW, total reactive load [reactive_load_3] MVAR.
- 04:00 ~ 05:00 total active load [active_load_4] MW, total reactive load [reactive_load_4] MVAR.
- 05:00 ~ 06:00 total active load [active_load_5] MW, total reactive load [reactive_load_5] MVAR.
- 06:00 ~ 07:00 total active load [active_load_6] MW, total reactive load [reactive_load_6] MVAR.
- 07:00 ~ 08:00 total active load [active_load_7] MW, total reactive load [reactive_load_7] MVAR.
- 08:00 ~ 09:00 total active load [active_load_8] MW, total reactive load [reactive_load_8] MVAR.
- 09:00 ~ 10:00 total active load [active_load_9] MW, total reactive load [reactive_load_9] MVAR.
- 10:00 ~ 11:00 total active load [active_load_10] MW, total reactive load [reactive_load_10] MVAR.
- 11:00 ~ 12:00 total active load [active_load_11] MW, total reactive load [reactive_load_11] MVAR.
- 12:00 ~ 13:00 total active load [active_load_12] MW, total reactive load [reactive_load_12] MVAR.
- 13:00 ~ 14:00 total active load [active_load_13] MW, total reactive load [reactive_load_13] MVAR.
- 14:00 ~ 15:00 total active load [active_load_14] MW, total reactive load [reactive_load_14] MVAR.
- 15:00 ~ 16:00 total active load [active_load_15] MW, total reactive load [reactive_load_15] MVAR.
- 16:00 ~ 17:00 total active load [active_load_16] MW, total reactive load [reactive_load_16] MVAR.
- 17:00 ~ 18:00 total active load [active_load_17] MW, total reactive load [reactive_load_17] MVAR.
- 18:00 ~ 19:00 total active load [active_load_18] MW, total reactive load [reactive_load_18] MVAR.
- 19:00 ~ 20:00 total active load [active_load_19] MW, total reactive load [reactive_load_19] MVAR.
- 20:00 ~ 21:00 total active load [active_load_20] MW, total reactive load [reactive_load_20] MVAR.
- 21:00 ~ 22:00 total active load [active_load_21] MW, total reactive load [reactive_load_21] MVAR.
- 22:00 ~ 23:00 total active load [active_load_22] MW, total reactive load [reactive_load_22] MVAR.
- 23:00 ~ 24:00 total active load [active_load_23] MW, total reactive load [reactive_load_23] MVAR. (next page)

User: Current Situation

- 00:00 ~ 01:00 total active generation [pv_0] MW.
- 01:00 ~ 02:00 total active generation [pv_1] MW.
- 02:00 ~ 03:00 total active generation [pv_2] MW.
- 03:00 ~ 04:00 total active generation [pv_3] MW.
- 04:00 ~ 05:00 total active generation [pv_4] MW.
- 05:00 ~ 06:00 total active generation [pv_5] MW.
- 06:00 ~ 07:00 total active generation [pv_6] MW.
- 07:00 ~ 08:00 total active generation [pv_7] MW.
- 08:00 ~ 09:00 total active generation [pv_8] MW.
- 09:00 ~ 10:00 total active generation [pv_9] MW.
- 10:00 ~ 11:00 total active generation [pv_10] MW.
- 11:00 ~ 12:00 total active generation [pv_11] MW.
- 12:00 ~ 13:00 total active generation [pv_12] MW.
- 13:00 ~ 14:00 total active generation [pv_13] MW.
- 14:00 ~ 15:00 total active generation [pv_14] MW.
- 15:00 ~ 16:00 total active generation [pv_15] MW.
- 16:00 ~ 17:00 total active generation [pv_16] MW.
- 17:00 ~ 18:00 total active generation [pv_17] MW.
- 18:00 ~ 19:00 total active generation [pv_18] MW.
- 19:00 ~ 20:00 total active generation [pv_19] MW.
- 20:00 ~ 21:00 total active generation [pv_20] MW.
- 21:00 ~ 22:00 total active generation [pv_21] MW.
- 22:00 ~ 23:00 total active generation [pv_22] MW.
- 23:00 ~ 24:00 total active generation [pv_23] MW.

The final action of this experience is:
[final_action]

The total reward of this experience is:
[total_reward]

The voltage profile of this experience is:
- 00:00 ~ 01:00 average voltage is [average_v_0] p.u., highest voltage is [highest_v_0] p.u., lowest voltage is [lowest_v_0] p.u.
- 01:00 ~ 02:00 average voltage is [average_v_1] p.u., highest voltage is [highest_v_1] p.u., lowest voltage is [lowest_v_1] p.u.
- 02:00 ~ 03:00 average voltage is [average_v_2] p.u., highest voltage is [highest_v_2] p.u., lowest voltage is [lowest_v_2] p.u.
- 03:00 ~ 04:00 average voltage is [average_v_3] p.u., highest voltage is [highest_v_3] p.u., lowest voltage is [lowest_v_3] p.u.
- 04:00 ~ 05:00 average voltage is [average_v_4] p.u., highest voltage is [highest_v_4] p.u., lowest voltage is [lowest_v_4] p.u.
- 05:00 ~ 06:00 average voltage is [average_v_5] p.u., highest voltage is [highest_v_5] p.u., lowest voltage is [lowest_v_5] p.u.
- 06:00 ~ 07:00 average voltage is [average_v_6] p.u., highest voltage is [highest_v_6] p.u., lowest voltage is [lowest_v_6] p.u.
- 07:00 ~ 08:00 average voltage is [average_v_7] p.u., highest voltage is [highest_v_7] p.u., lowest voltage is [lowest_v_7] p.u.
- 08:00 ~ 09:00 average voltage is [average_v_8] p.u., highest voltage is [highest_v_8] p.u., lowest voltage is [lowest_v_8] p.u.
- 09:00 ~ 10:00 average voltage is [average_v_9] p.u., highest voltage is [highest_v_9] p.u., lowest voltage is [lowest_v_9] p.u.
(next page)

User: Current Situation

- 10:00 ~ 11:00 average voltage is [average_v_10] p.u., highest voltage is [highest_v_10] p.u., lowest voltage is [lowest_v_10] p.u.
- 11:00 ~ 12:00 average voltage is [average_v_11] p.u., highest voltage is [highest_v_11] p.u., lowest voltage is [lowest_v_11] p.u.
- 12:00 ~ 13:00 average voltage is [average_v_12] p.u., highest voltage is [highest_v_12] p.u., lowest voltage is [lowest_v_12] p.u.
- 13:00 ~ 14:00 average voltage is [average_v_13] p.u., highest voltage is [highest_v_13] p.u., lowest voltage is [lowest_v_13] p.u.
- 14:00 ~ 15:00 average voltage is [average_v_14] p.u., highest voltage is [highest_v_14] p.u., lowest voltage is [lowest_v_14] p.u.
- 15:00 ~ 16:00 average voltage is [average_v_15] p.u., highest voltage is [highest_v_15] p.u., lowest voltage is [lowest_v_15] p.u.
- 16:00 ~ 17:00 average voltage is [average_v_16] p.u., highest voltage is [highest_v_16] p.u., lowest voltage is [lowest_v_16] p.u.
- 17:00 ~ 18:00 average voltage is [average_v_17] p.u., highest voltage is [highest_v_17] p.u., lowest voltage is [lowest_v_17] p.u.
- 18:00 ~ 19:00 average voltage is [average_v_18] p.u., highest voltage is [highest_v_18] p.u., lowest voltage is [lowest_v_18] p.u.
- 19:00 ~ 20:00 average voltage is [average_v_19] p.u., highest voltage is [highest_v_19] p.u., lowest voltage is [lowest_v_19] p.u.
- 20:00 ~ 21:00 average voltage is [average_v_20] p.u., highest voltage is [highest_v_20] p.u., lowest voltage is [lowest_v_20] p.u.
- 21:00 ~ 22:00 average voltage is [average_v_21] p.u., highest voltage is [highest_v_21] p.u., lowest voltage is [lowest_v_21] p.u.
- 22:00 ~ 23:00 average voltage is [average_v_22] p.u., highest voltage is [highest_v_22] p.u., lowest voltage is [lowest_v_22] p.u.
- 23:00 ~ 24:00 average voltage is [average_v_23] p.u., highest voltage is [highest_v_23] p.u., lowest voltage is [lowest_v_23] p.u.

Assistant: Current Situation

Ok, I will analyze the profiles, final action, voltage problems, and provide suggestions for improvement. Meanwhile, I will minimize the amount of adjustments while ensuring that the constraints of OLTC and SC.

User: Organize Reasoning Process

Based on the above analysis, please organize your reasoning process. In the organized reasoning process, do not mention the formatted final action!

Output Format
1. Analysis of the trend of the load profile.
"'Please fill this part with your analysis of the trend of the load profile"'
2. Analysis of the trend of the PV generation profile.
"'Please fill this part with your analysis of the trend of the PV generation profile"'
3. Analysis of the magnitudes of the load and PV generation.
"'Please fill this part with your analysis of the magnitudes of the load and PV generation"'
4. Decision of the action time and action magnitude.
"'Please fill this part with your decision of the action time and action magnitude."'

Rules
1. Organize your reasoning process strictly following the output format.
2. Be precise when generating your reasoning process.
3. Do not mention the formatted final action.
4. Do not answer anything else!! You just need to organize your reasoning process according to the output format!!

User: Organize Action

Organize your formatted final action. You only need to list the final action according to the output format, do not generate anything else!

Output Format
<Tap_Time>[0, tap_time1, tap_time2, tap_time3, tap_time4]</Tap_Time>
<Tap_Position>[tap_position0, tap_position1, tap_position2, tap_position3, tap_position4]</Tap_Position>
<SC1_Commitment_Time>[0, sc1_commitment_time1, sc1_commitment_time2]</SC1_Commitment_Time>
<SC1_Commitment_Status>[sc1_commitment_status0, sc1_commitment_status1, sc1_commitment_status2]</SC1_Commitment_Status>
<SC2_Commitment_Time>[0, sc2_commitment_time1, sc2_commitment_time2]</SC2_Commitment_Time>
<SC2_Commitment_Status>[sc2_commitment_status0, sc2_commitment_status1, sc2_commitment_status2]</SC2_Commitment_Status>
<SC3_Commitment_Time>[0, sc3_commitment_time1, sc3_commitment_time2]</SC3_Commitment_Time>
<SC3_Commitment_Status>[sc3_commitment_status0, sc3_commitment_status1, sc3_commitment_status2]</SC3_Commitment_Status>
<SC4_Commitment_Time>[0, sc4_commitment_time1, sc4_commitment_time2]</SC4_Commitment_Time>
<SC4_Commitment_Status>[sc4_commitment_status0, sc4_commitment_status1, sc4_commitment_status2]</SC4_Commitment_Status>
<SC5_Commitment_Time>[0, sc5_commitment_time1, sc5_commitment_time2]</SC5_Commitment_Time>
<SC5_Commitment_Status>[sc5_commitment_status0, sc5_commitment_status1, sc5_commitment_status2]</SC5_Commitment_Status>

REFERENCES

[1] X. Yang et al., “RL2: Reinforce Large Language Model to Assist Safe Reinforcement Learning for Energy Management of Active Distribution Networks,” IEEE Trans. Smart Grid, vol. 16, no. 4, pp. 3419-3431, Jul. 2025.

[2] X. Yang, H. Liu and W. Wu, "Attention-Enhanced Multi-Agent Reinforcement Learning Against Observation Perturbations for Distributed Volt-VAR Control," IEEE Tran. Smart Grid, vol. 15, no. 6, pp. 5761-5772, Nov. 2024.

[3] J. Wang, W. Xu, Y. Gu, W. Song, and T. C. Green, “Multi-agent reinforcement learning for active voltage control on power distribution networks,” in Proc. Adv. Neural Inf. Process. Syst., 2021, pp. 1–14.