

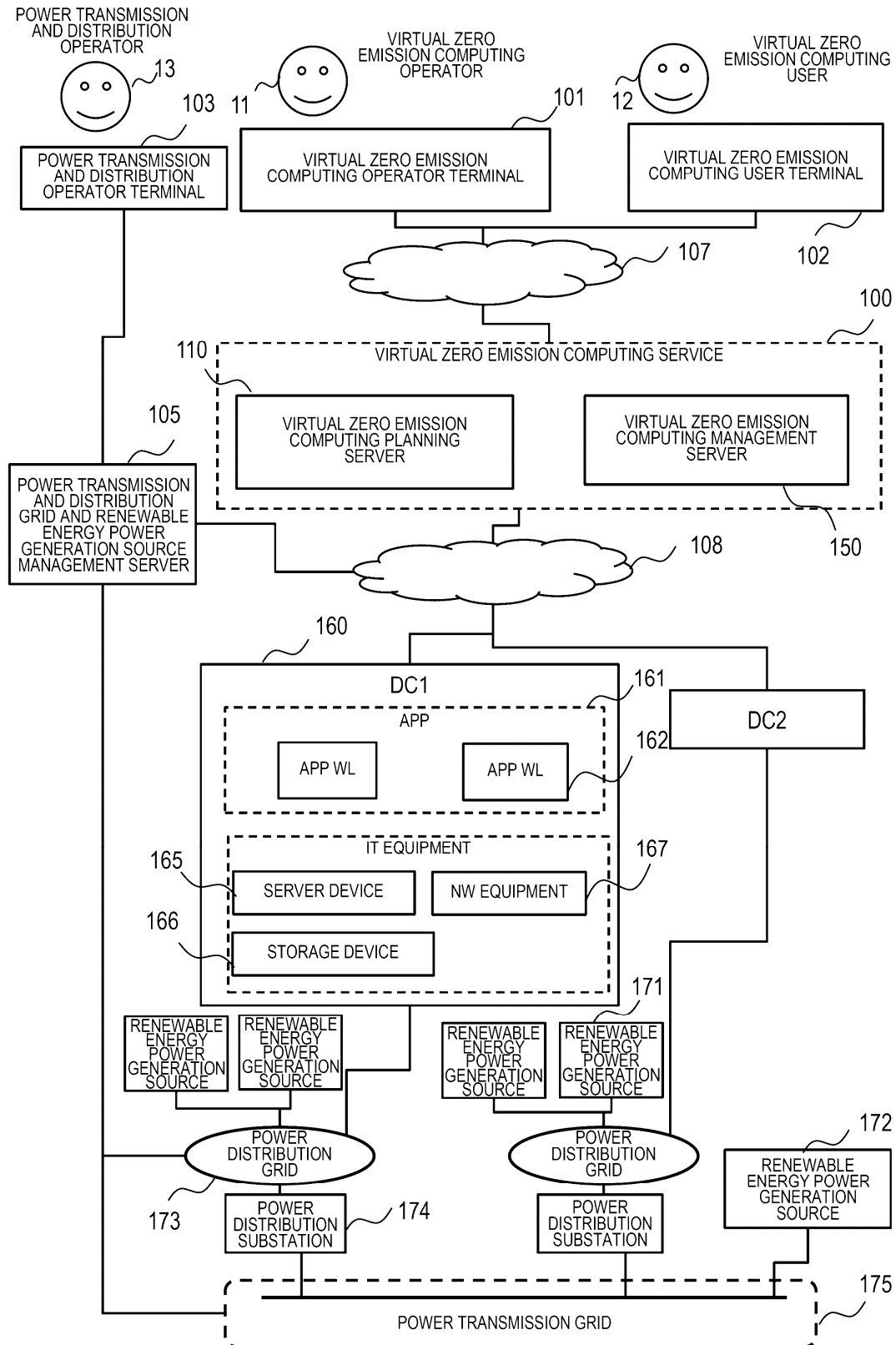
FIG. 1

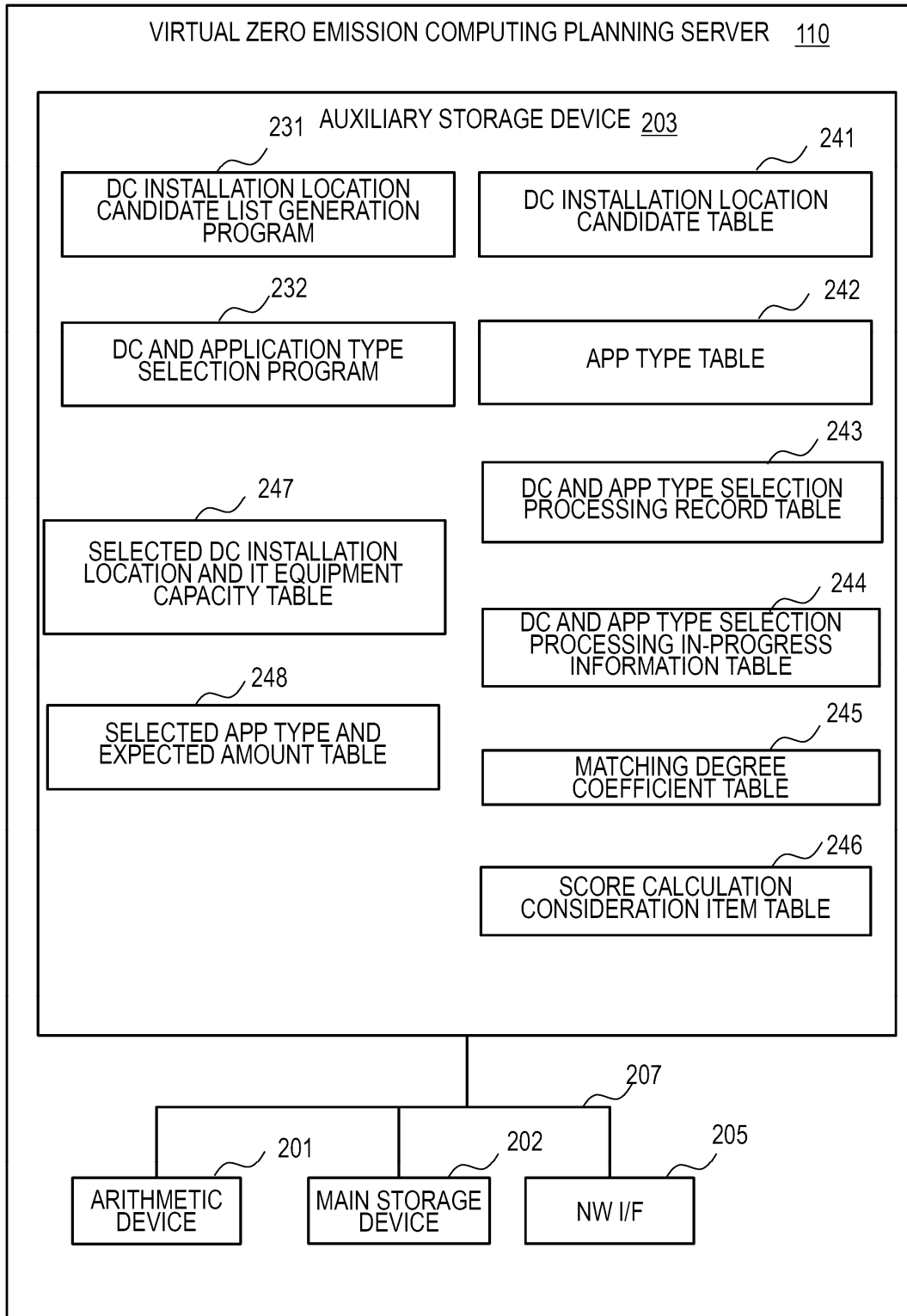
FIG. 2

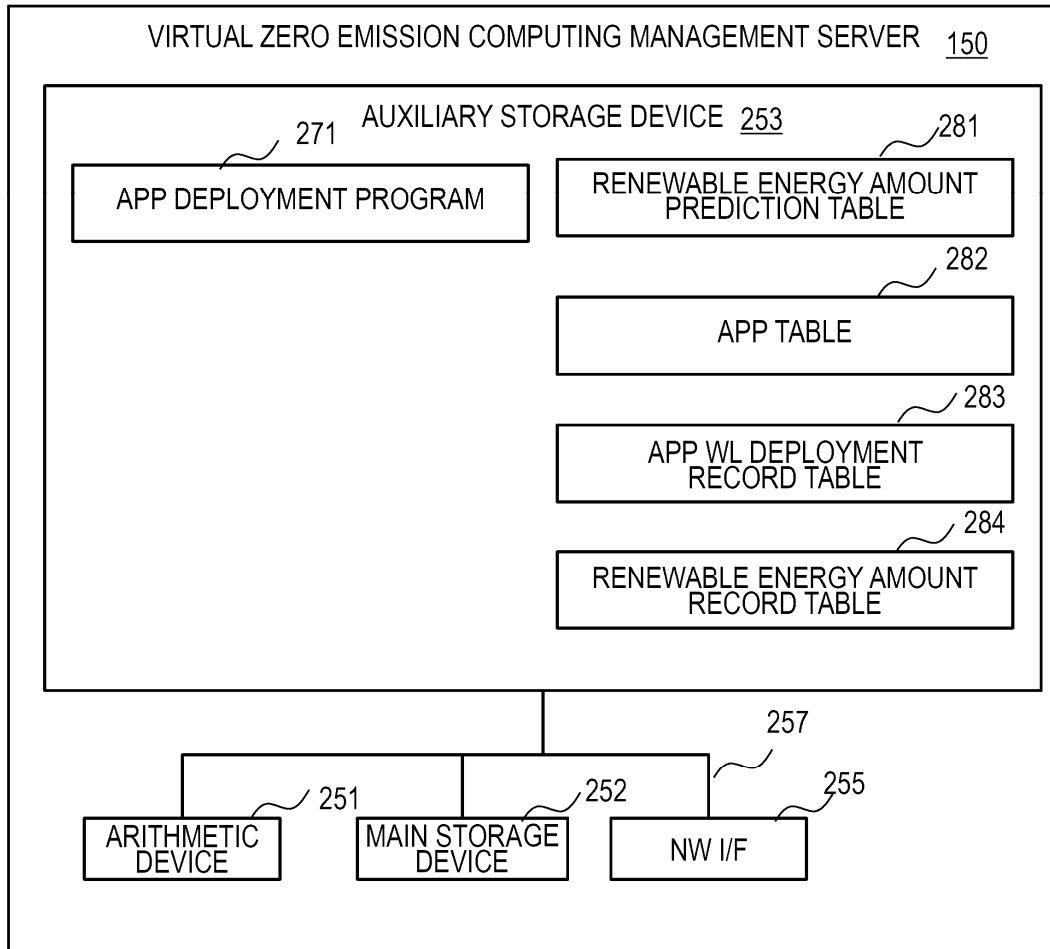
FIG. 3

FIG. 4

301	302	303	304	305	306	307	308	309
DC INSTALLATION LOCATION CANDIDATE ID	LOCATION	COVERAGE RANGE	CHARACTERISTIC (AVERAGE OR FLUCTUATION OF RENEWABLE ENERGY AMOUNT)	CAPABILITY	FORM	DC COST UNIT PRICE	DC CANDIDATE PRIORITY	ASSUMED PUE
1	POWER DISTRIBUTION SUBSTATION 1	POWER DISTRIBUTION GRIDS 1, 2, 3 MEGA SOLAR 1	0:00 0 kW ($\pm 2\%$) ... 15:00 200 kW ($\pm 30\%$) ... 23:00 3 kW ($\pm 2\%$) ... FLUCTUATION: LARGE	GPU	CONTAINER DC	0.1	0.8	1.3
2	POWER DISTRIBUTION SUBSTATION 1	POWER DISTRIBUTION GRIDS 1, 2, 3 MEGA SOLAR 1	0:00 0 kW ($\pm 2\%$) ... 15:00 200 kW ($\pm 30\%$) ... 23:00 3 kW ($\pm 2\%$) ... FLUCTUATION: LARGE	WITHOUT GPU	CONTAINER DC	0.1	0.8	1.3
3	POWER DISTRIBUTION SUBSTATION 1	POWER DISTRIBUTION GRID 1	0:00 0 kW ($\pm 2\%$) ... 15:00 100 kW ($\pm 30\%$) ... 23:00 3 kW ($\pm 2\%$) ... FLUCTUATION: LARGE	GPU	CONTAINER DC	0.1	1.0	1.4
4	POWER DISTRIBUTION SUBSTATION 21	POWER DISTRIBUTION GRIDS 21, 22, 23, 24, 25	0:00 15 kW ($\pm 5\%$) ... 15:00 500 kW ($\pm 8\%$) ... 23:00 3 kW ($\pm 2\%$) ... FLUCTUATION: SMALL	GPU	MEDIUM-SCALE DC	0.2	0.6	1.3
...	...	...	...	...	...	...	...	...

DC INSTALLATION LOCATION CANDIDATE TABLE 241 ↗

FIG. 5

321		322		323		324		325		326		327		328	
APP TYPE ID	APP NAME	FLUCTUATION (CHARACTERISTIC)	CONTROL FLEXIBILITY (CHARACTERISTIC)	DC CAPABILITY RELATED REQUIREMENT	APP POWER CONSUMPTION RATIO (APP POWER CONSUMPTION/IT EQUIPMENT POWER CONSUMPTION (CAPACITY))	EXPECTED NUMBER OF USERS (NUMBER OF USERS/KW)	USER UNIT PRICE								
1	DaaS (Desktop as a Service)	SMALL	SMALL	—	0.5	60	0.02 MILLION YEN/YEAR								
2	ML (MODEL CREATION)	LARGE	LARGE	GPU	0.8	7.5	0.3 MILLION YEN/YEAR								
:	:	:	:												

APP TYPE TABLE 242

FIG. 6

PROCESSING ID		EXECUTION DATE AND TIME	INPUT (USER INPUT)	OUTPUT
1		2022/4/1/ 10:00	MINIMUM RENEWABLE ENERGY AMOUNT TO BE USED: 2000 kWh/DAY DC COST UPPER LIMIT: 500 MILLION YEN USE CASE: INITIAL PLAN	"SELECTED DC INSTALLATION LOCATION AND IT EQUIPMENT CAPACITY TABLE" = ID 1, 2 "SELECTED APP TYPE AND EXPECTED AMOUNT TABLE" = ID 1, 2
2		2022/10/1 11:00	MINIMUM RENEWABLE ENERGY AMOUNT TO BE USED: 3500 kWh/DAY DC COST UPPER LIMIT: 600 MILLION YEN USE CASE: DURING INCREASE OR DECREASE IN NUMBER OF DCs	"SELECTED DC INSTALLATION LOCATION AND IT EQUIPMENT CAPACITY TABLE" ID 3 "SELECTED APP TYPE AND EXPECTED AMOUNT TABLE" ID 3
:		:	:	:

DC AND APP TYPE SELECTION PROCESSING RECORD TABLE 243 ↗

FIG. 7

COMBINATION ID	PROCESSING ID	APP TYPE ID	DC INSTALLATION LOCATION CANDIDATE ID	RENEWABLE ENERGY AMOUNT	DC COST	MATCHING DEGREE	INDIVIDUAL SCORE	TOTAL SCORE
1	1	APP TYPE 1 APP TYPE 2	DC CANDIDATE 1 DC CANDIDATE 4	DC CANDIDATE 1: 2000 kWh/DAY DC CANDIDATE 4: 1000 kWh/DAY --- TOTAL: 3000 kWh/DAY (CONDITION OK)	DC CANDIDATE 1: 200 MILLION YEN (= 2000 kWh*0.1) DC CANDIDATE 4: 100 MILLION YEN (= 1000 kWh*0.1) --- TOTAL: 300 MILLION YEN (CONDITION OK)	APP TYPE 1-DC CANDIDATE 1: 0.06 (= 0.1*2000/(2000+1000)) APP TYPE 1-DC CANDIDATE 4: 0.3 (= 1.0*1000/(2000+1000)) APP TYPE 2-DC CANDIDATE 1: 0.3 (= 0.5*2000/(2000+1000)) APP TYPE 2-DC CANDIDATE 4: 0.16 (= 0.5*1000/(2000+1000))	APP TYPE 1-DC CANDIDATE 1: 0.048 (= MATCHING DEGREE 0.06*0.9*1.0 (CAPABILITY*0.8 (DC CANDIDATE PRIORITY)) APP TYPE 1-DC CANDIDATE 4: 0.3 (= 0.3*0.9*1.0*1.0) APP TYPE 2-DC CANDIDATE 1: 0.24 (= 0.3*0.9*1.0*0.8) APP TYPE 2-DC CANDIDATE 4: 0.015 (= 0.16*0.9*1.0*1.0)	0.6 (= TOTAL 0.6*1.0 (OVERLAPPING OF DC CANDIDATE COVERAGE RANGE))
2	1	APP TYPE 2	DC CANDIDATE 3 DC CANDIDATE 4	DC CANDIDATE 3: 1000 kWh/DAY DC CANDIDATE 4: 1000 kWh/DAY --- TOTAL: 2000 kWh/DAY (CONDITION OK)	DC CANDIDATE 3: 100 MILLION YEN (= 1000 kWh*0.1) DC CANDIDATE 4: 100 MILLION YEN (= 1000 kWh*0.1) --- TOTAL: 200 MILLION YEN (CONDITION OK)	APP TYPE 2-DC CANDIDATE 3: 0.25 (= 0.5*1000/(1000+1000)) APP TYPE 2-DC CANDIDATE 4: 0.25 (= 0.5*1000/(1000+1000))	APP TYPE 2-DC CANDIDATE 3: 0.225 (= 0.25*0.9* 1.0* 1.0) APP TYPE 2-DC CANDIDATE 4: 0.0225 (= 0.25*0.9* 0.1* 1.0)	0.24 (= TOTAL 0.24*1.0 (OVERLAPPING OF DC CANDIDATE COVERAGE RANGE))
3	1	APP TYPE 1	DC CANDIDATE 3	DC CANDIDATE 3: 1000 kWh/DAY --- TOTAL: 1000 kWh/DAY (CONDITION NG)	DC CANDIDATE 3: 100 MILLION YEN (= 1000 kWh*0.1) --- TOTAL: 100 MILLION YEN (CONDITION OK)	NOT A TARGET BECAUSE OF RENEWABLE ENERGY AMOUNT CONDITION NG	---	---

DC AND APP TYPE SELECTION PROCESSING IN-PROGRESS INFORMATION TABLE 244 ↗

FIG. 8

ID	APP TYPE CHARACTERISTIC		DC CHARACTERISTIC	MATCHING DEGREE CALCULATION COEFFICIENT
	FLUCTUATION	CONTROL FLEXIBILITY	FLUCTUATION	
1	SMALL	SMALL	SMALL	1.0
2	SMALL	SMALL	LARGE	0.1
3	SMALL	LARGE	SMALL	1.0
4	SMALL	LARGE	LARGE	1.0
5	LARGE	SMALL	SMALL	0.1
6	LARGE	SMALL	LARGE	0.1
7	LARGE	LARGE	SMALL	0.5
8	LARGE	LARGE	LARGE	0.5

MATCHING DEGREE COEFFICIENT TABLE 245 ↗

FIG. 9

ID	ITEM	APPLICATION METHOD (CALCULATION FORMULA)	TARGET (COMBINATION OF INDIVIDUAL SCORES, TOTAL SCORE)
1	CHARACTERISTIC (MATCHING DEGREE)	MATCHING DEGREE*0.9 (VALUE DEFINED BY USER)	INDIVIDUAL SCORE
2	CAPABILITY	CASE WHERE CAPABILITY OF DC CANDIDATE (ACQUIRED FROM "DC INSTALLATION LOCATION CANDIDATE TABLE") MATCHES CAPABILITY REQUIREMENT OF APP TYPE (ACQUIRED FROM "APP TYPE TABLE"): 1.0 IS MULTIPLIED AS COEFFICIENT NON-MATCHING CASE: 0.1 IS MULTIPLIED AS COEFFICIENT	INDIVIDUAL SCORE
3	DC CANDIDATE PRIORITY (DEFINED BY USER)	"DC CANDIDATE PRIORITY (DEFINED BY USER)" OF TARGET DC CANDIDATE IN "DC INSTALLATION LOCATION CANDIDATE TABLE" IS MULTIPLIED BY INDIVIDUAL SCORE AS COEFFICIENT	INDIVIDUAL SCORE
4	OVERLAPPING OF DC CANDIDATE COVERAGE RANGES	CASE WHERE COVERAGE RANGES OF DC CANDIDATES OVERLAP EACH OTHER: 0.3 IS MULTIPLIED BY TOTAL SCORE AS COEFFICIENT NON-OVERLAPPING CASE: 1.0 IS MULTIPLIED BY TOTAL SCORE AS COEFFICIENT	TOTAL SCORE
:	:		

SCORE CALCULATION CONSIDERATION ITEM TABLE 246 ↗

FIG. 10

ID	DC ID	UPDATE DATE AND TIME	STATE	IT EQUIPMENT CAPACITY
1	1	2022/4/1	BEING OPERATED	200 kW (= MAXIMUM RENEWABLE ENERGY 200 kW*(1 + FLUCTUATION 0.3)*PUE 1.3)
2	4	2022/4/1	BEING OPERATED	70 kWh (= MAXIMUM RENEWABLE ENERGY 100 kW*(1 + FLUCTUATION 0.05)*PUE 1.5)
3	5	2022/10/1	BEING INSTALLED	2000 kWh
:	:	:		:

SELECTED DC INSTALLATION LOCATION AND IT EQUIPMENT CAPACITY TABLE 247 ↗

FIG. 11

ID	APP TYPE ID	UPDATE DATE AND TIME	STATE	EXPECTED AMOUNT (POWER CONSUMPTION)	EXPECTED APP PROFIT
1	1	2022/4/1	BEING OPERATED	135 kW (= IT EQUIPMENT CAPACITY OF DC1 200 kW*APP POWER CONSUMPTION RATIO 0.5 + IT EQUIPMENT CAPACITY OF DC4 70 kW*APP POWER CONSUMPTION RATIO 0.5)	162 MILLION YEN/YEAR (= EXPECTED AMOUNT 135 kW*CONVERSION OF EXPECTED NUMBER OF USERS 60*USER UNIT PRICE 0.02)
2	2	2022/4/1	BEING CONSTRUCTED	216 kW (= IT EQUIPMENT CAPACITY OF DC1 200 kW*APP POWER CONSUMPTION RATIO 0.8 + IT EQUIPMENT CAPACITY OF DC4 70 kW*APP POWER CONSUMPTION RATIO 0.8)	486 MILLION YEN/YEAR (= EXPECTED AMOUNT 216 kW*CONVERSION OF EXPECTED NUMBER OF USERS 7.5*USER UNIT PRICE 0.3)
3	2	2022/10/1	BEING CONSTRUCTED	300 kW	675 MILLION YEN/YEAR
:	:			:	

SELECTED APP TYPE AND EXPECTED AMOUNT TABLE 248 ↗

FIG. 12

ID	DC ID	TIME	RENEWABLE ENERGY PREDICTION AMOUNT
1	1	2022/4/3 10:00-11:00	80kWh
2	1	2022/4/3 11:00-12:00	100kWh
:	:	:	
11	2	2022/4/3 10:00-11:00	90kWh
:	:	:	

RENEWABLE ENERGY AMOUNT PREDICTION TABLE 281

FIG. 13

APP ID	APP NAME	APP TYPE ID	USER
11	DaaS	1	USER A
21	ML	2	USER B
:		:	:

APP TABLE 282

FIG. 14

APP WL DEPLOYMENT RECORD ID	DEPLOYMENT DATE AND TIME	APP ID	STATE	DEPLOYMENT DESTINATION DC ID	POWER CONSUMPTION
1	2022/4/3 10:00:00	11	END	1	1kWh
2	2022/4/3 11:00:00	21	END	3	1kWh
:	:	:			

APP WL DEPLOYMENT RECORD TABLE 283

FIG. 15

RENEWABLE ENERGY AMOUNT RECORD ID	DC ID	TIME	RENEWABLE ENERGY AMOUNT
1	1	2022/4/3 10:00-11:00	100kWh
2	1	2022/4/3 11:00-12:00	110kWh
:			:

RENEWABLE ENERGY AMOUNT RECORD TABLE 284

FIG. 16

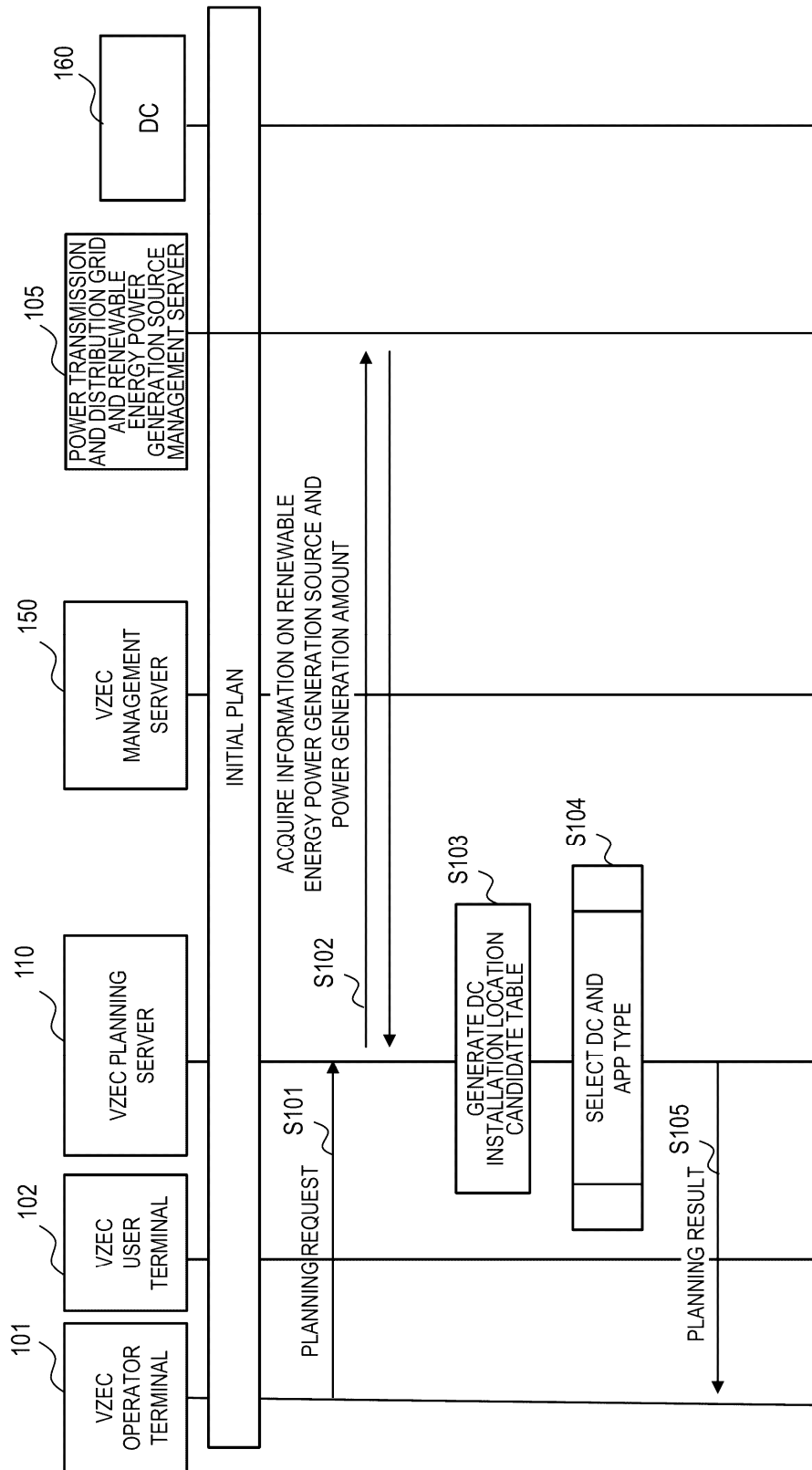


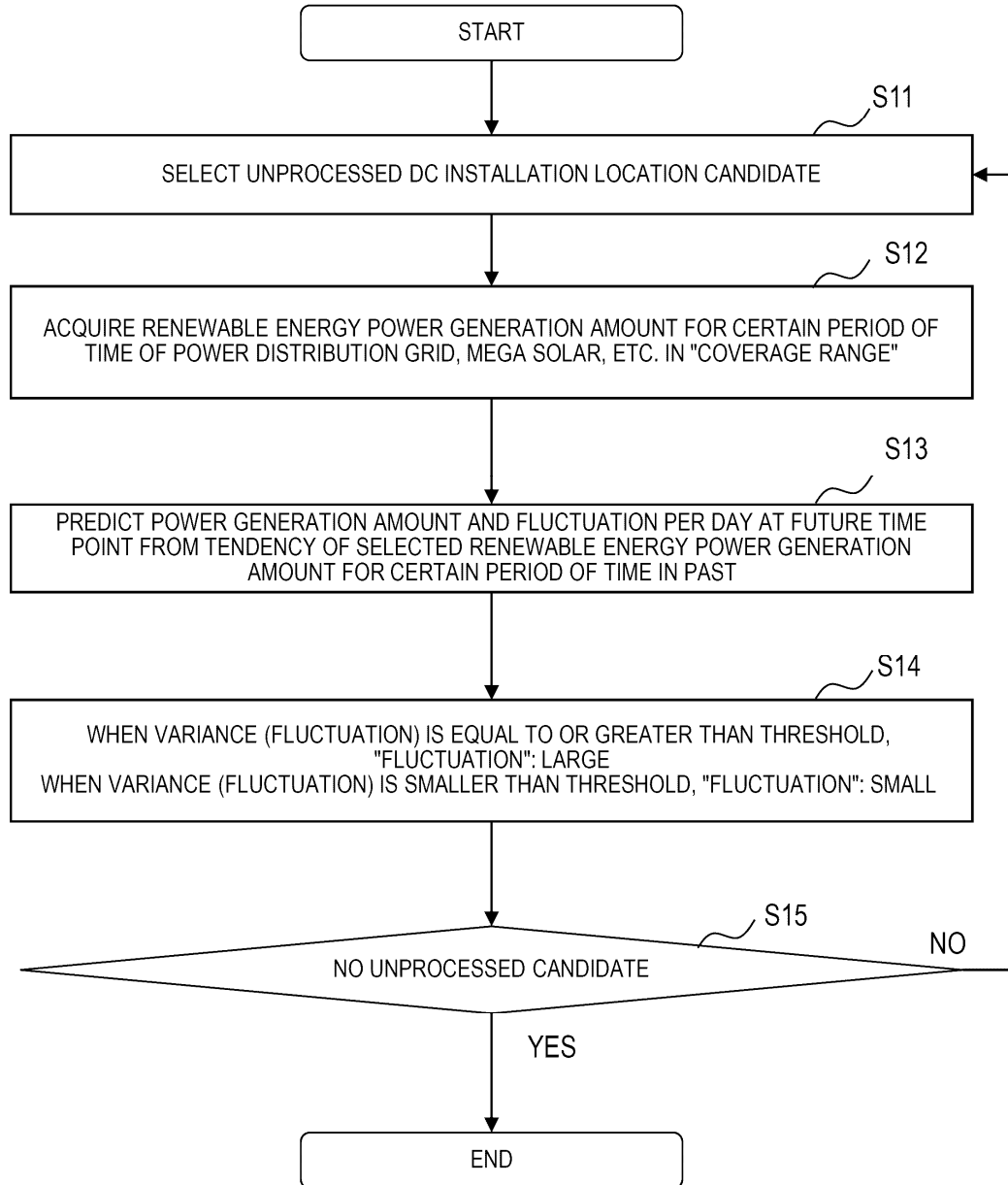
FIG. 17DC INSTALLATION LOCATION CANDIDATE
TABLE GENERATION

FIG. 18

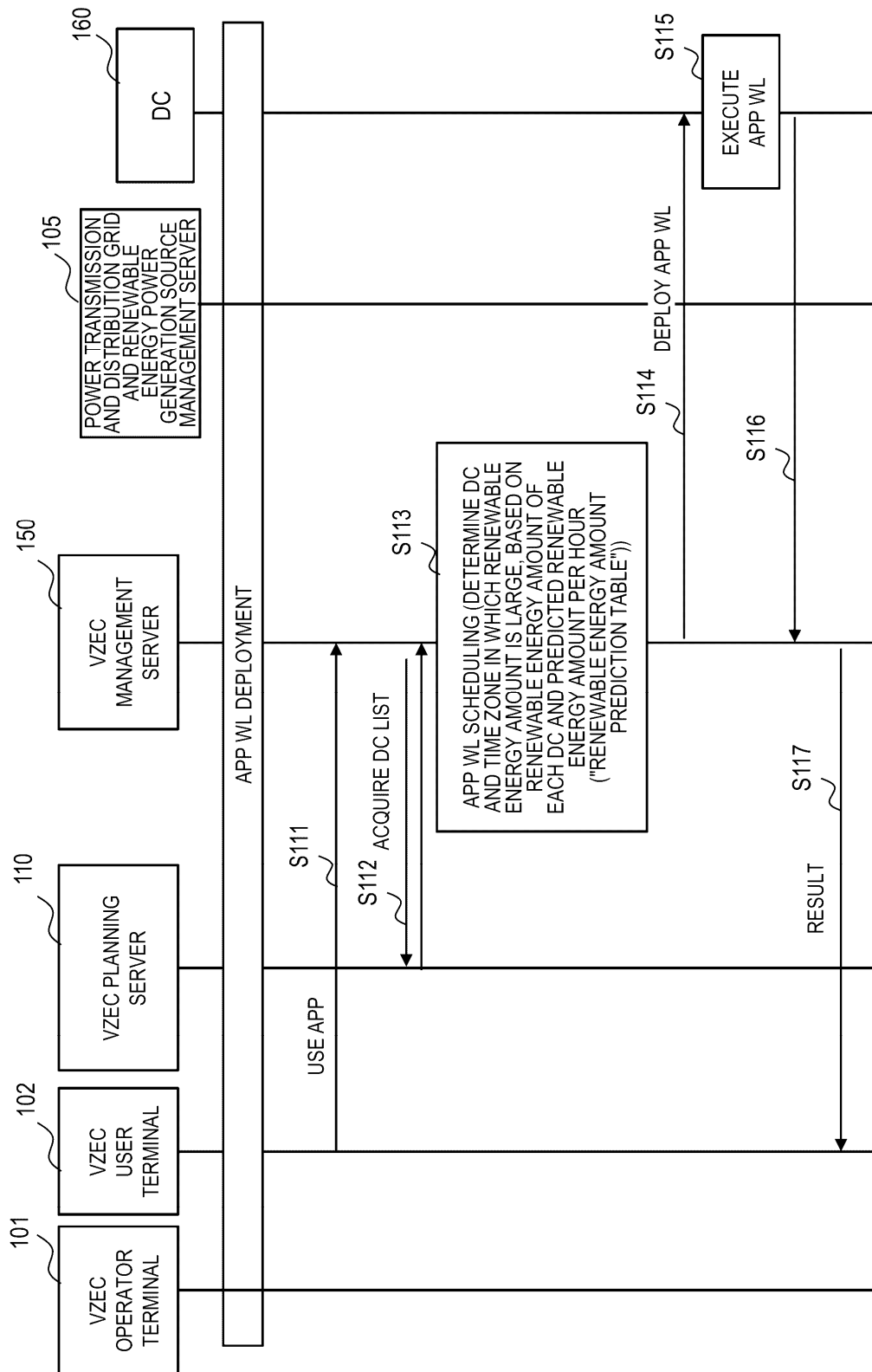


FIG. 19

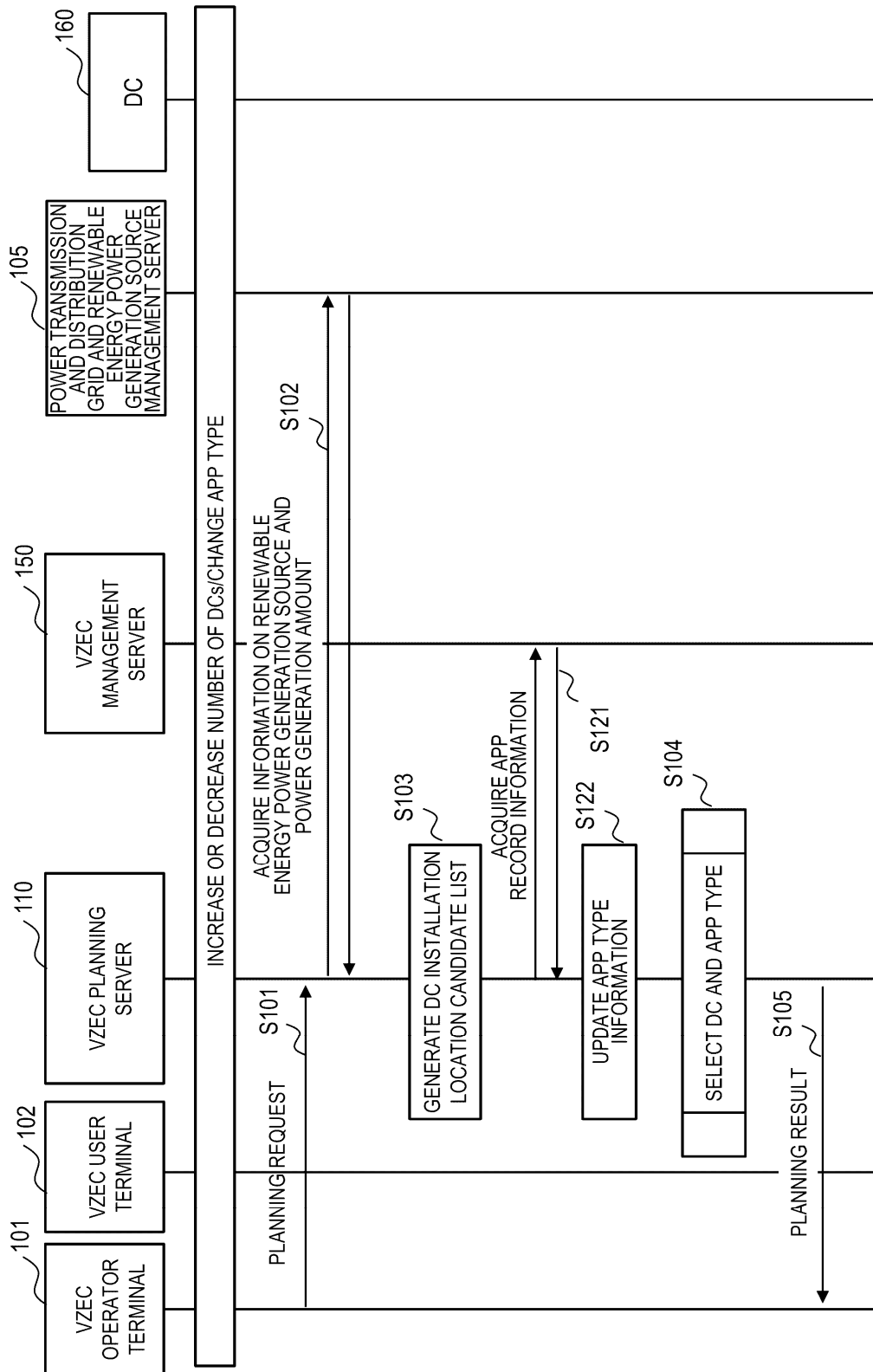


FIG. 20A

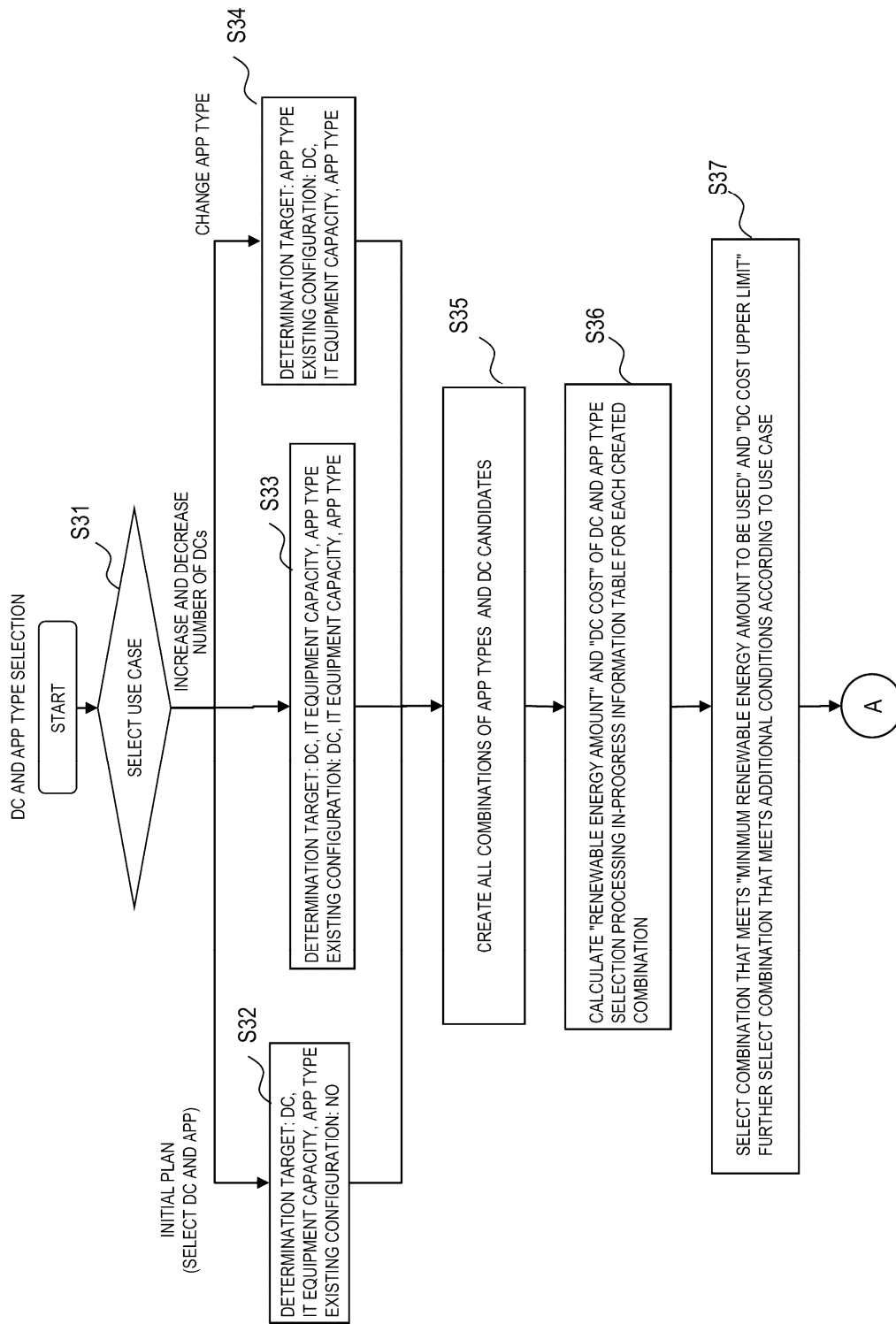


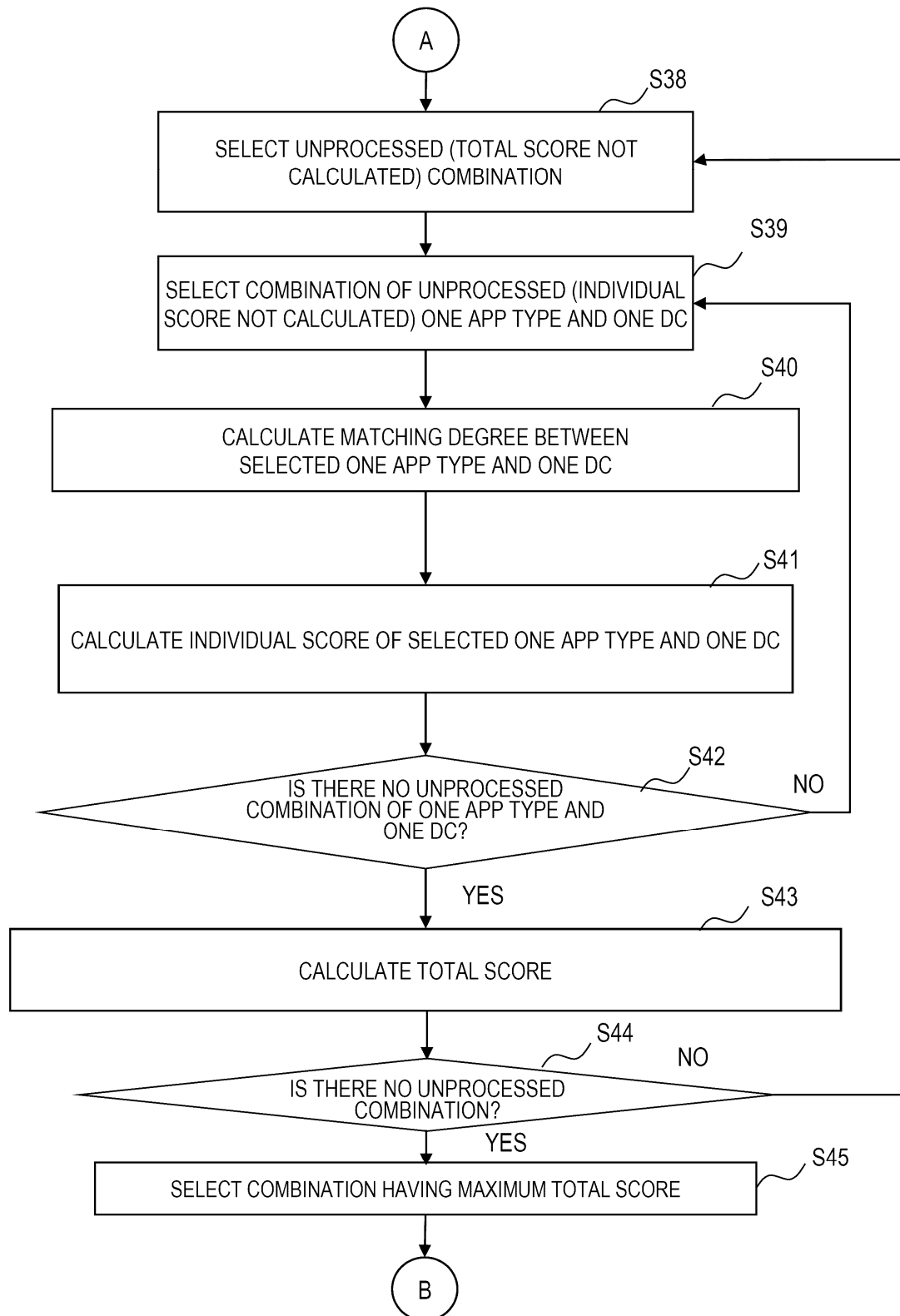
FIG. 20B

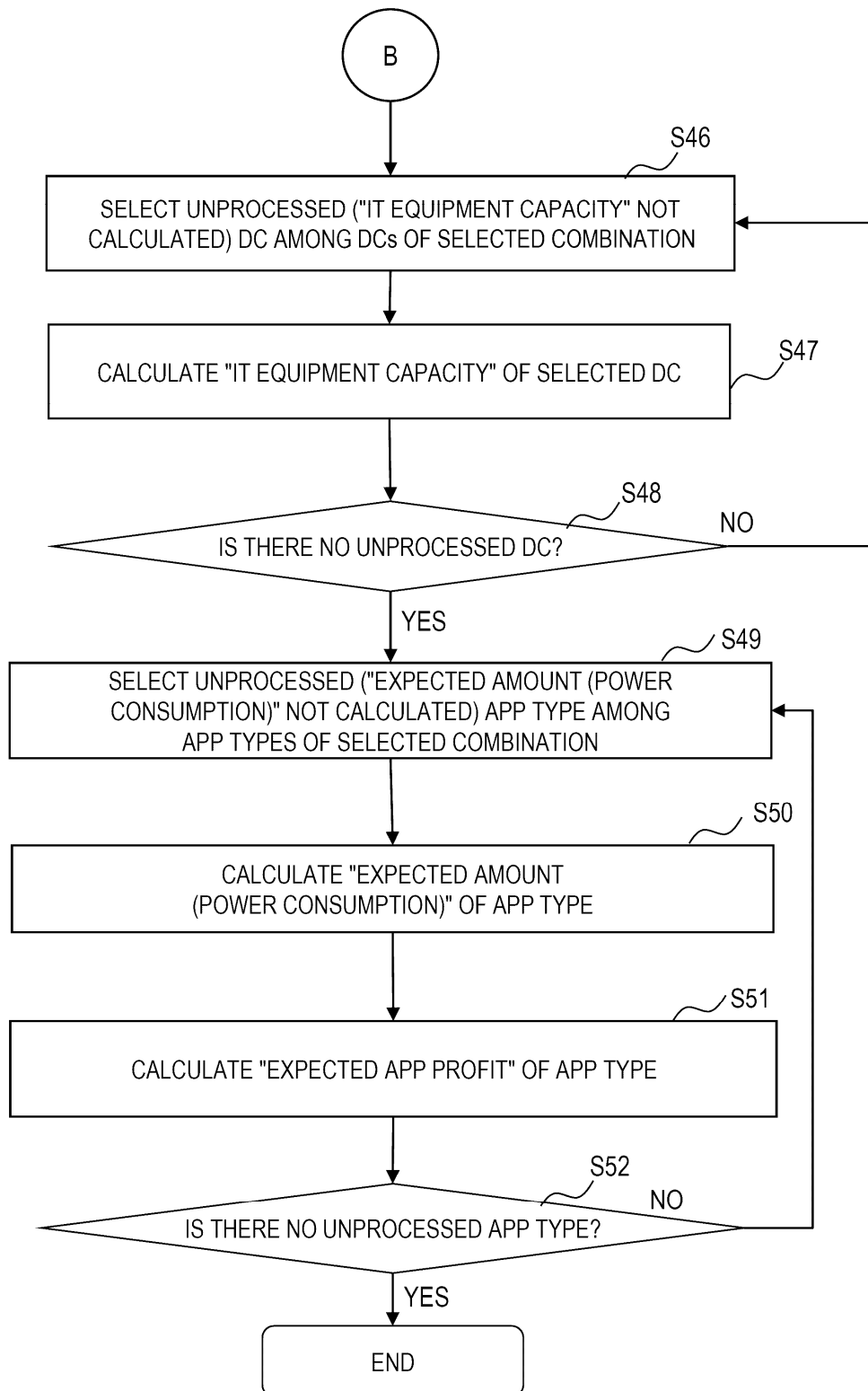
FIG. 20C

FIG. 21

510

SELECT CANDIDATES

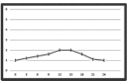
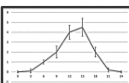
APP TYPE CANDIDATE

511

APP TYPE ID	APP NAME	FLUCTUATION	CONTROL FLEXIBILITY
1	DaaS (Desktop as a Service)	SMALL	SMALL
2	ML (MODEL CREATION)	LARGE	LARGE
:	:	:	

DC INSTALLATION LOCATION CANDIDATE

512

DC CANDIDATE ID	LOCATION	COVERAGE RANGE	CHARACTERISTIC (RENEWABLE ENERGY AMOUNT, FLUCTUATION)
1	POWER DISTRIBUTION SUBSTATION 1	POWER DISTRIBUTION GRIDS 1, 2, 3 MEGA SOLAR 1	
2	POWER DISTRIBUTION SUBSTATION 1	POWER DISTRIBUTION GRIDS 1, 2, 3 MEGA SOLAR 1	
:	:	:	

513

INPUT PARAMETERS

MINIMUM RENEWABLE ENERGY AMOUNT TO BE USED:

DC COST UPPER LIMIT:

CREATE PLAN

514

DC AND APP TYPE PLAN CREATION

FIG. 22