Our Company's Profile and Businesses

Sep. 9th. 2024

E.I. Engineering Co., Ltd.

Overview of our Company

◆**Representative**: Teruhiko Ogawa

Background:
Chemical Plant Manager,
Project Development Dept. Manager of Kawasaki Heavy Industries Co., Ltd.

◆**History**

Mar. 2005: Company founded with a capital of 10 million yen

Sep. 2008: Development of Enepro21 Regular.

Apr. 2009: Granted domestic patent for Enepro21 Regular (No. 4564594).

Mar. 2013: Granted US patent for Enepro21 Regular (US8,396,605 B2).

Jun. 2016: Development of EPS21 (Energy Prediction System).

Dec. 2017: Development of Enepro21Expert (Optimal Operating Support System)

Jan. 2022: Development of Enepro21 World Edition (Energy Simulation in English)

Oct. 2022: Release of Enepro21 Ver.6
(Functionally enhancement for solar system with BESS and FC.)

Our Proposed Software

Our company has been developing advanced energy simulation software called "**Enepro21 World Edition**," which supports the **design and optimization of various energy systems**. These include Combined Heat and Power (CHP), centrifugal and absorption chillers, boilers, heat storage systems, and solar power systems with battery integration.

The Japanese version is already widely utilized by universities, architectural design firms, and District Heating and Cooling (DHC) companies. Having established a strong presence in Japan, we are now excited to **launch our software in Malaysia**.

We also offer **consulting services** using our software to **recreate and simulate your current energy systems on your PCs**, leveraging the energy data accumulated at your company.

Furthermore, we provide **comprehensive support for high-efficiency operations** to optimize your energy management. We are confident that our solutions can provide significant value to your business and look forward to supporting your success.

Key Features①

◆Comprehensive Support of Energy System Design:

Enepro21 Regular offers a diverse range of capabilities, including CHP, centrifugal and absorption chillers, heat storage, and solar power systems with batteries.

Factors to Energy Simulation

- Outside Air Temp.(Dry/Wet)
- Solar Radiation

Energy Source

- Power
- Natural Gas
- Diesel Oil
- Heavy Oil
- Hydrogen
- Unused Energy (Sea, River)

Equipment List(Examples)

Chilling Units

- Centrifugal Chillers(Const.)
- Centrifugal Chillers(Inv.)
- Absorption Chillers
- Heat Pumps

Heating Units

- Boilers
- Solar Ray Collectors

Power Units

- CHP (Engine/ Turbine)
- Fuel Cells
- Solar Power System

Energy Storage

- Chilled/Hot Water Storage
- Ice Storage
- Batteries

Energy Load

- Power Load
- Cooling Load
- Heating Load (Steam/Hot Water)

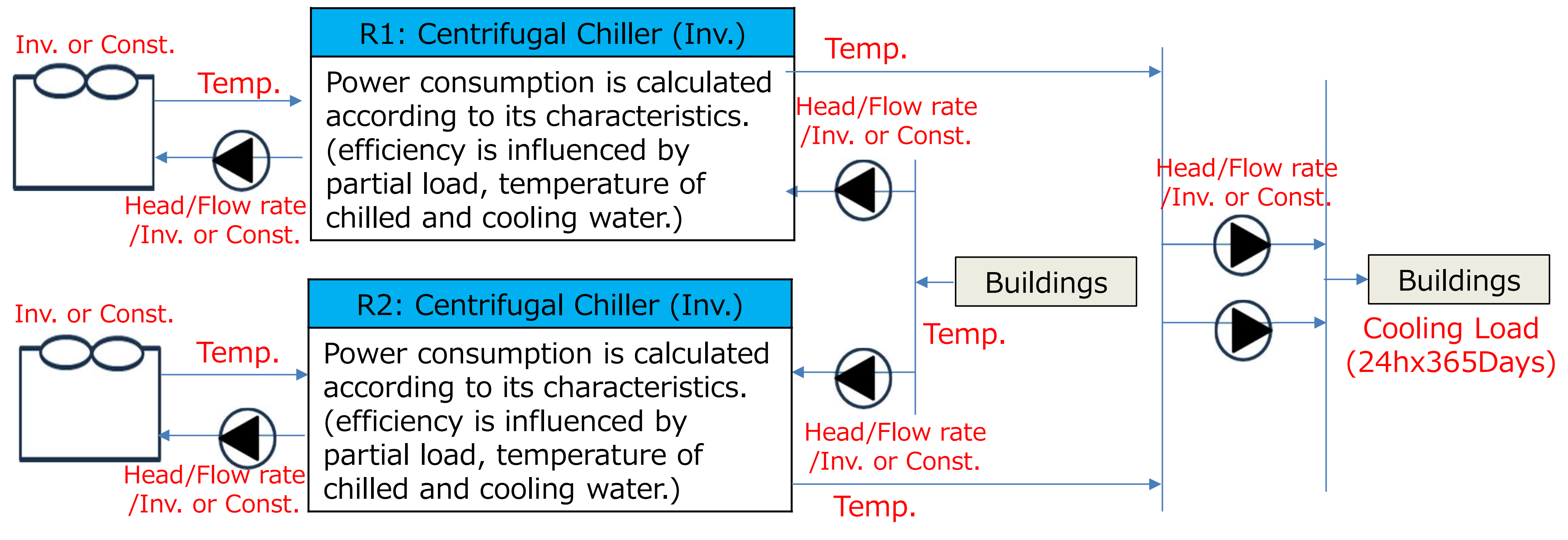
Whatever your energy project entails, we have you covered!

Key Features②

◆Powerful Simulation:

Benefit from accurate and detailed simulations to make informed decisions about your energy projects. This software is a game-changer for universities, energy system design companies, and District Heating and Cooling (DHC) companies.

Ex. Simulation of Centrifugal Chillers for DHC) You can set the following reds.



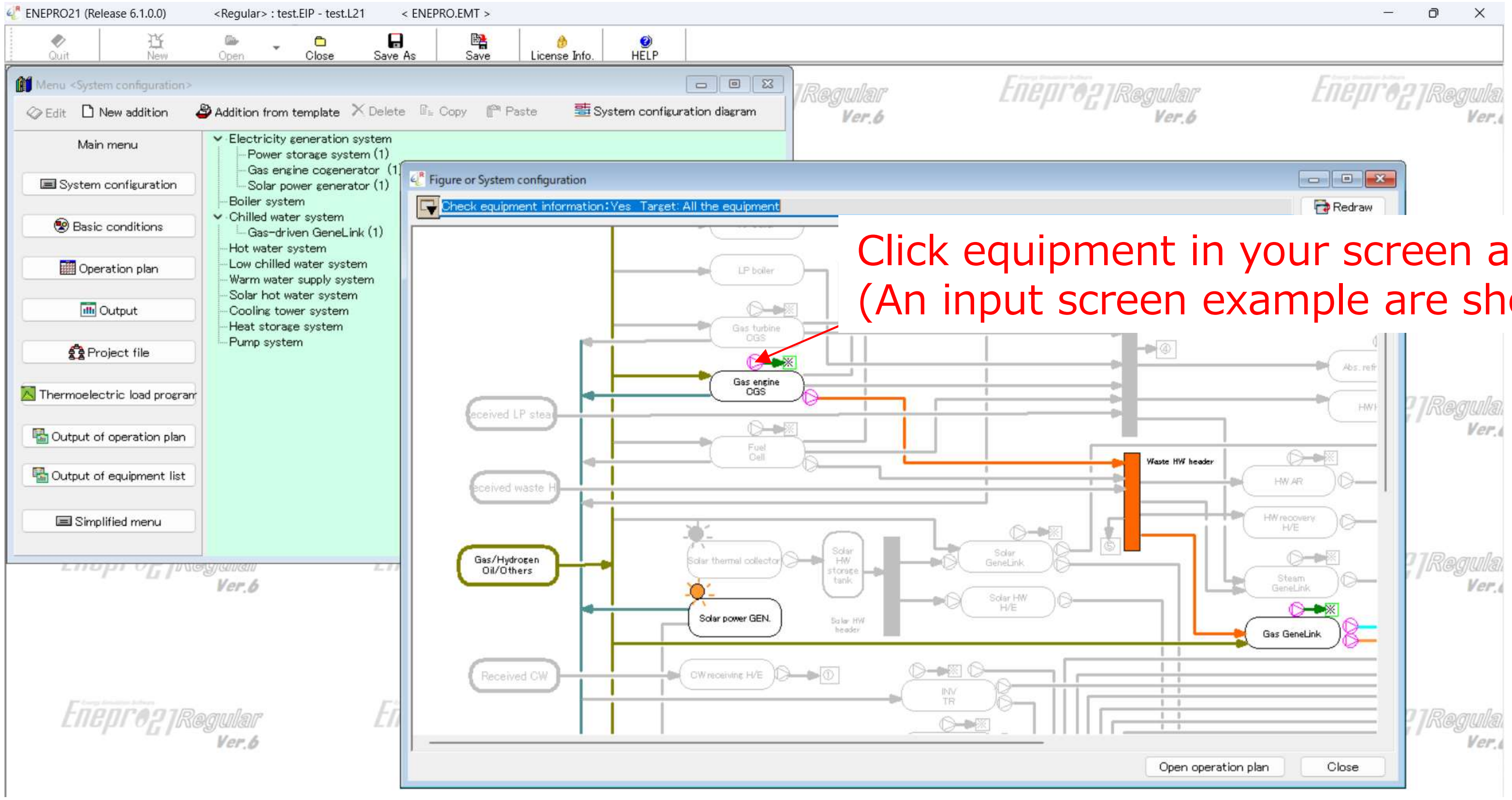
You can simulate energy system you design as you operate it!

Energy Simulation Software Enepro21 Regular

Key Features③

◆User-Friendly Interface:

Our intuitive interface allows users of all levels to design, simulate and optimize energy systems efficiently(You can operate our software in English as below).



Click equipment in your screen and input information.
(An input screen example are shown on the next page.)

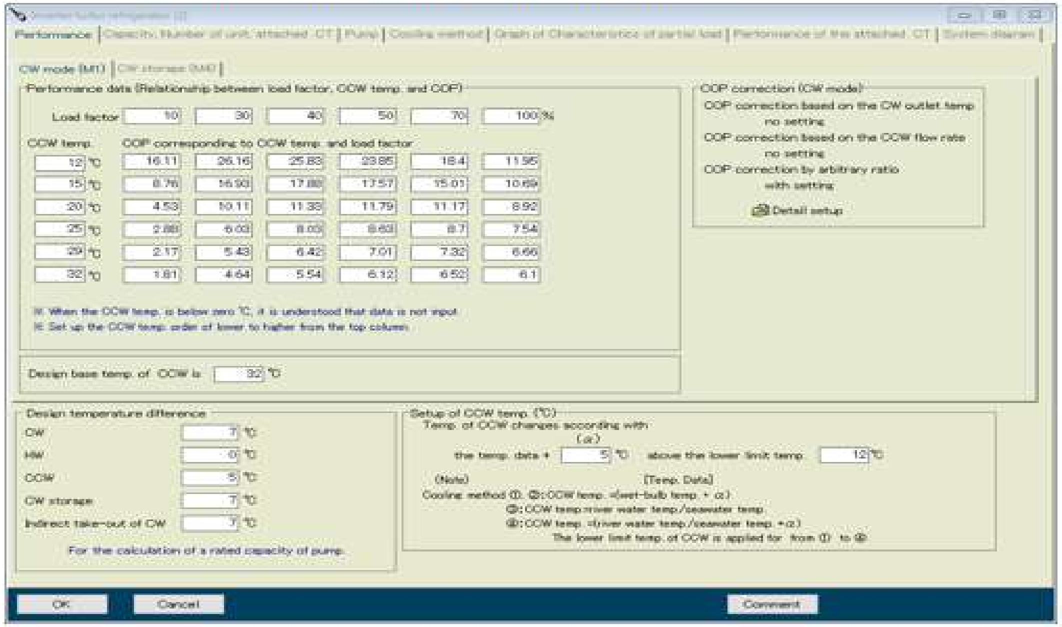
We prepare “Help Mode” in our software. And when you have any trouble, could you contact our help desk by email or phone? We are committed to providing optimal and strong support for your needs!

Energy Simulation Software Enepro21 Regular

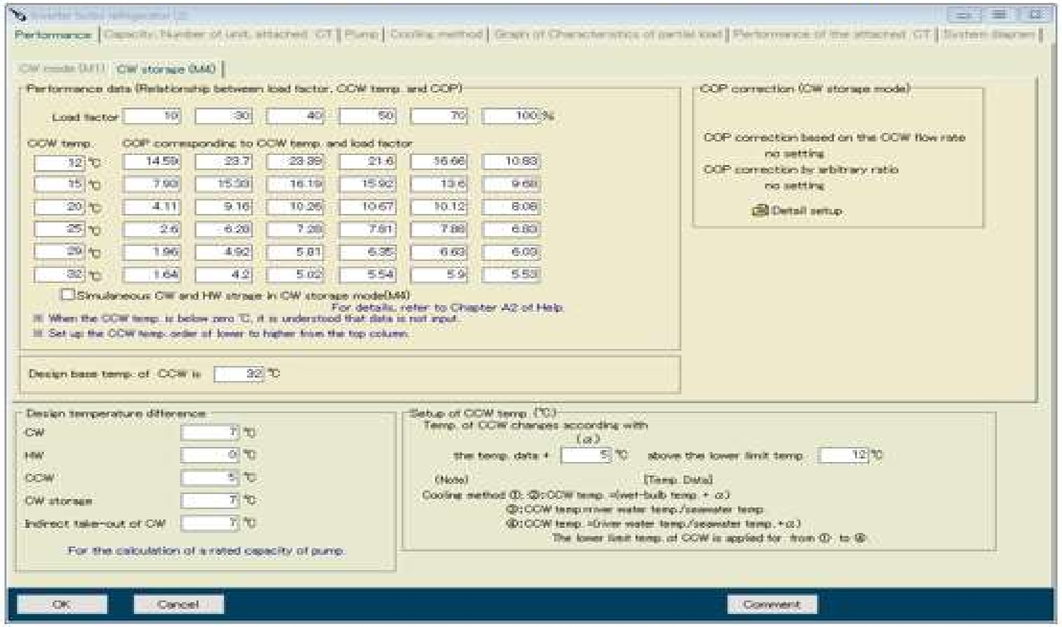
(Ref.) Input Screen Example

◆Ex. Specification Input of Centrifugal Chillers

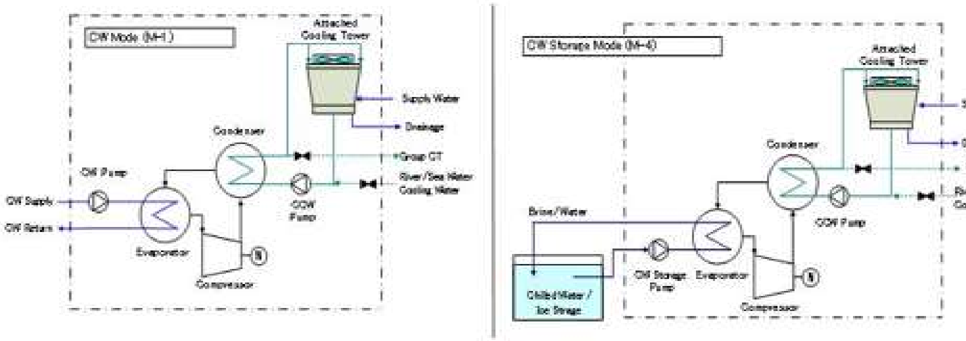
Chilled water supply temperature 7 ℃



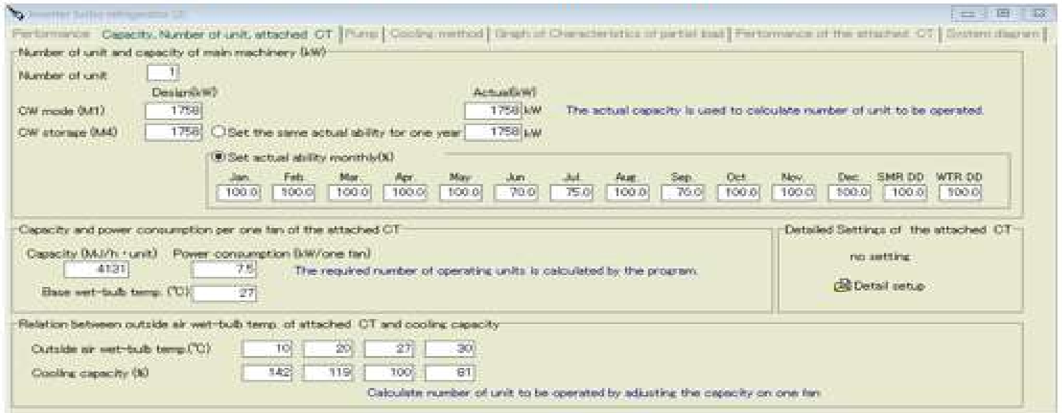
Chilled water 5 ℃ heat storage mode performance data



Download data flow chart



Capacity / number / attached cooling tower

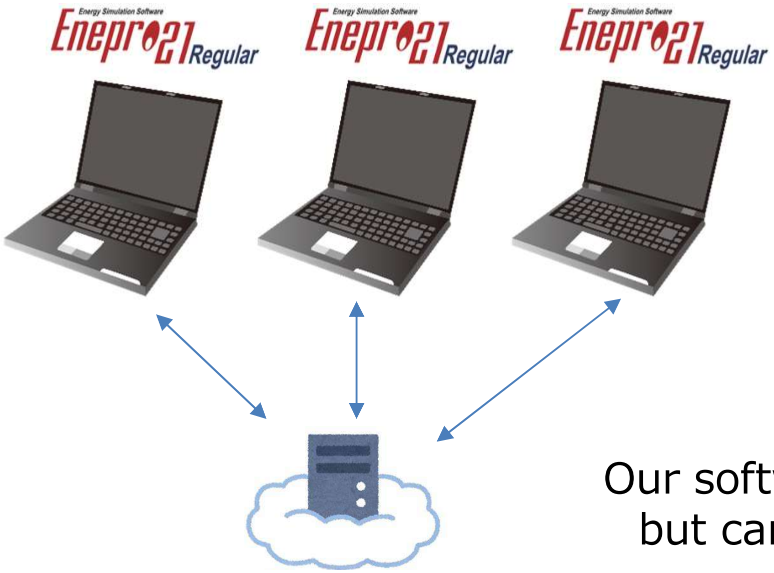


Key Features④

◆Subscription-Based Model:

Enepro21 World Edition operates on a subscription basis, ensuring flexibility and affordability for your organization. We are gearing up to launch special pricing plans for our software, ensuring both value and excellence in Malaysia.

Subscription Image



Our software operates by connecting to our company's server, which grants permission for use and ensures access to system updates and new (latest developed features: solar power systems with batteries) .

Our software can be installed on multiple computers but can only be used on one computer at a time.

Here are examples of energy simulation software considerations.

Example of Energy Simulation①

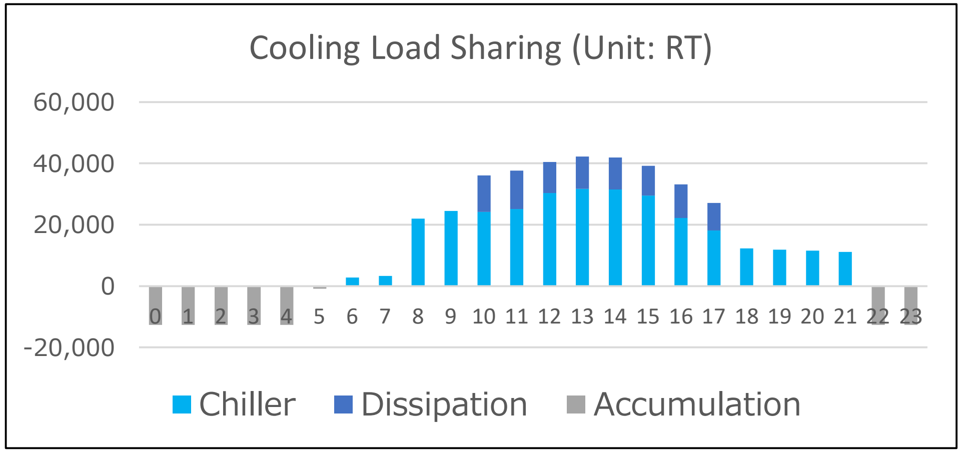
Energy Simulation Software Enepro21 Regular

◆Study for DR by using Cooling Water Storage:

Some district cooling plants utilize cooling water storage tanks.
This software can calculate the potential kilowatt reductions during demand response(DR) suppression.

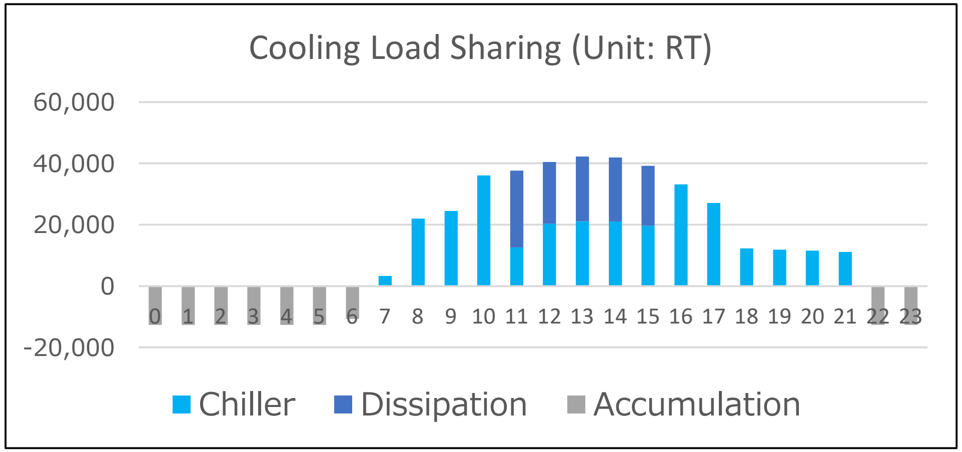
Ex. Demand response via heat dissipation control at an energy center
(Centrifugal Chiller 1,000RT x 5, Cooling Heat Storage 10,000RTh)

Average heat dissipation from 10 to 18



Time	11-12	12-13	13-14	14-15
Power Load(kW)	1,377	1,768	1,822	1,754

Intensive heat dissipation from 11 to 15



Time	11-12	12-13	13-14	14-15
Power Load(kW)	759	1,241	1,278	1,273
Reduction(kW)	618↓	527↓	544↓	481↓

Example of Energy Simulation②

Energy Simulation Software Enepro21 Regular

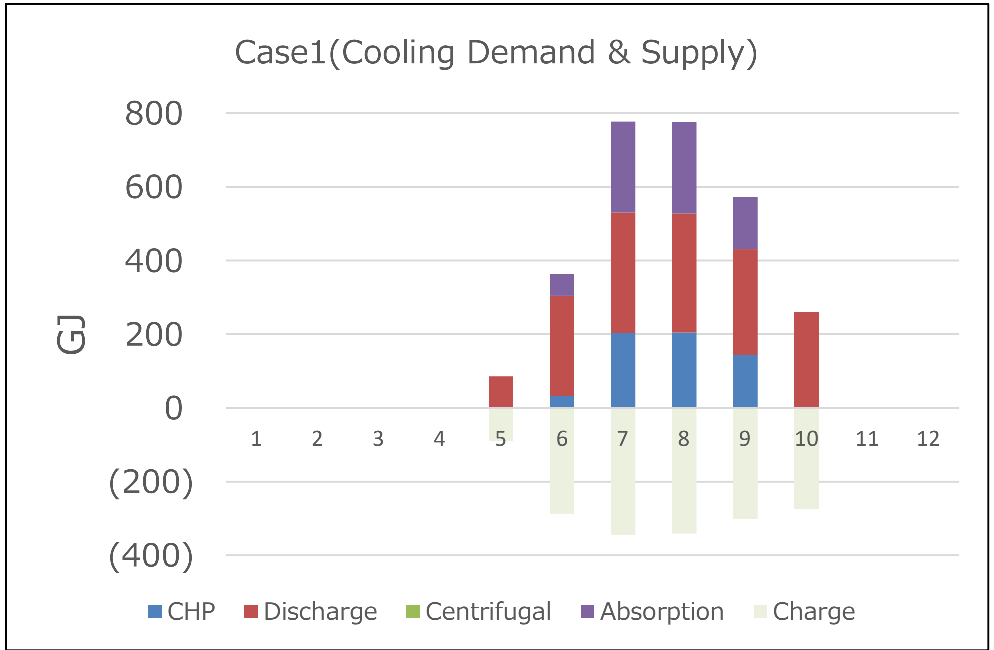
◆Study for Changing Priority for Equipment Operation:

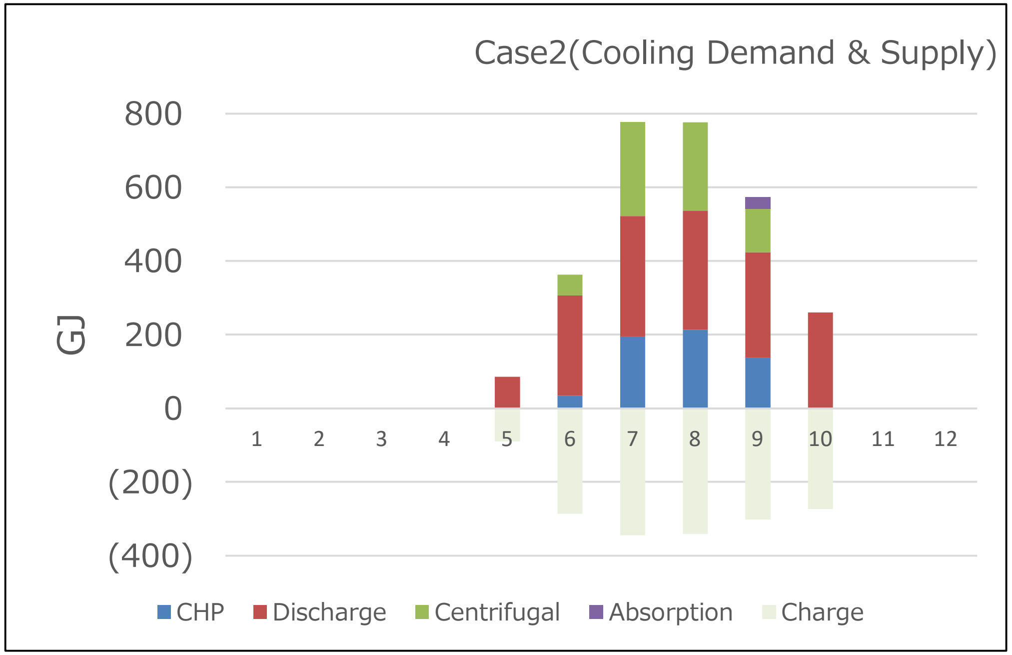
This software determines the priority for equipment operation.

Ex. Case1: CHP → Cooling Storage Discharge
→ Centrifugal Chillers → Absorption Chillers

Case2: CHP → Cooling storage Discharge
→ Absorption Chillers → Centrifugal Chillers

	Case1	Case2
Energy Consumption (Primary) GJ	41,570(Original)	41,396(99.6%)





Example of Energy Simulation③

◆Study for Setting Cooling Water Temperature for Cooling Towers:

This software can determine the optimal cooling water temperature setpoint for cooling towers.

Ex. Case1: SP of Cooling Water 32、Case2: SP of Cooling Water 27℃

	Cooling Water Temperature 32℃						Cooling Water Temperature 27℃					
	Temp. (℃)	Power Consumption(kWh)					Temp. (℃)	Power Consumption(kWh)				
		Chiller(COP)		CT	Pump	Amount		Chiller(COP)		CT	Pump	Amount
0	30.4	117.7	(3.13)	0.5	8.8	127.0	27.0	109.6	(3.37)	1.0	8.8	119.4
1	30.4	117.7	(3.14)	0.5	8.8	127.0	27.0	109.6	(3.37)	1.0	8.8	119.4
2	30.1	117.0	(3.16)	0.5	8.8	126.2	27.0	109.6	(3.37)	0.9	8.8	119.3
3	30.4	117.7	(3.14)	0.5	8.8	126.9	27.0	109.6	(3.37)	1.0	8.8	119.4
4	30.1	117.0	(3.16)	0.5	8.8	126.2	27.0	109.6	(3.37)	0.9	8.8	119.3
5	30.4	117.7	(3.14)	0.5	8.8	126.9	27.0	109.6	(3.37)	1.0	8.8	119.4
6	30.5	117.8	(3.13)	0.5	8.8	127.1	27.0	109.6	(3.37)	1.0	8.8	119.4
7	30.5	92.6	(3.13)	0.4	6.9	99.9	27.0	86.1	(3.37)	0.8	6.9	93.9
8	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0
9	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0
10	32.0	93.7	(4.43)	0.5	9.2	103.4	27.0	85.7	(4.91)	1.7	9.1	96.5
11	32.0	90.8	(4.37)	0.5	8.9	100.1	27.0	83.4	(4.85)	1.5	8.8	93.6
12	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0
13	32.0	97.9	(4.48)	0.5	9.7	108.1	27.0	88.7	(4.97)	2.1	9.5	100.3
14	32.0	90.6	(4.37)	0.5	8.9	99.9	27.0	83.2	(4.85)	1.7	8.7	93.7
15	32.0	135.8	(4.58)	0.6	13.6	150.1	27.4	122.8	(5.05)	5.5	13.4	141.7
16	32.0	118.9	(4.63)	0.5	12.0	131.5	27.2	107.1	(5.12)	3.7	11.8	122.6
17	32.0	72.9	(3.90)	0.5	6.7	80.1	27.0	69.4	(4.33)	0.9	6.6	76.9
18	32.0	76.6	(4.04)	0.5	7.2	84.3	27.0	72.6	(4.48)	0.9	7.1	80.7
19	26.0	16.1	(2.23)	0.5	0.9	17.5	26.3	16.1	(2.22)	0.5	0.9	17.5
20	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0
21	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0
22	30.5	117.8	(3.13)	0.5	8.8	127.1	27.0	109.6	(3.37)	1.0	8.8	119.4
23	30.5	117.8	(3.13)	0.5	8.8	127.1	27.0	109.6	(3.37)	1.0	8.8	119.4
Amount	-	1,944	(3.60)	9	164	**2,117**	-	1,801	(3.92)	28	162	**1,992**

Energy Consulting Businesses by using our Software

Enepro21 Regular — Energy Simulation Software

◆Consulting of optimal operation and phased renovation for Existing Cooling System

We accurately recreate existing facilities on your PCs using as-built drawings and accumulated energy data. Then, we run simulations under different conditions to offer energy consulting services.

Malaysia		Japan
As-built Drawings of Cooling System Energy Data (Load, Energy Usage at each equipment)	⟺	Energy Consulting Services (as the followings)

Step 1	Operational Improvements Proposal without any investments by changing operational parameters etc..
Step 2	Minor Investment Proposal for exploring energy conservation by installing inverter pumps etc.
Step 3	Proposal for a Comprehensive Review of Energy Conservation Facilities

Firstly, we can provide energy consulting services before you determine our software installation.

Energy Simulation Consulting supported by Japanese Government①

1 .Smart Energy Survey for Krung Thep Aphiwat Smart City Project in Thailand

This software was employed in the comprehensive survey for the Krung Thep Aphiwat Smart City Project, proudly supported by the Ministry of Economy, Trade, and Industry, Japan

~2017 JICA Masterplan Study

~2020 JICA Smart City Study

2020~ **MOU between OTP and MLIT for Urban Development**

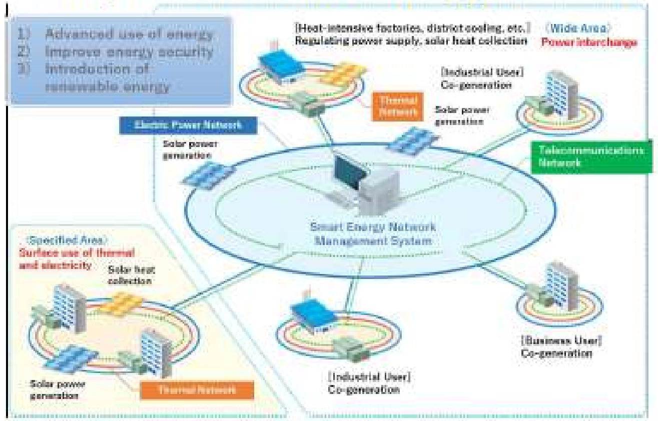
2021~ **NEDO: Demonstration Project**

SMART ENERGY

Smart Energy to enhance energy efficiency and independence from conventional energy system

- Cogeneration, District Cooling System, Energy Management System

Concept of the Smart Energy Network



Source：Osaka Gas Co., Ltd

SMART MOBILITY

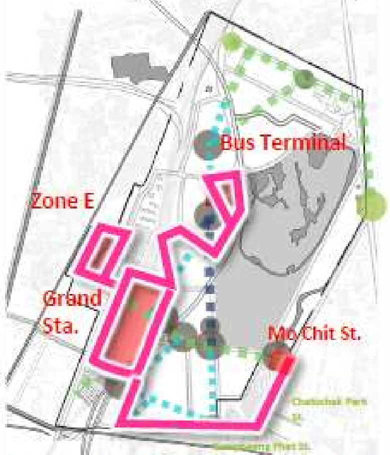
Smart Mobility to improve access to public transport and ensure safe and efficient mobility

- EV Personal Rapid Transit (PRT) system, Fuel Cell bus, Mobility Service

Personal Rapid Transit (e-Palette Shuttle Bus)

Fuel Cell Bus

Source：TDEM

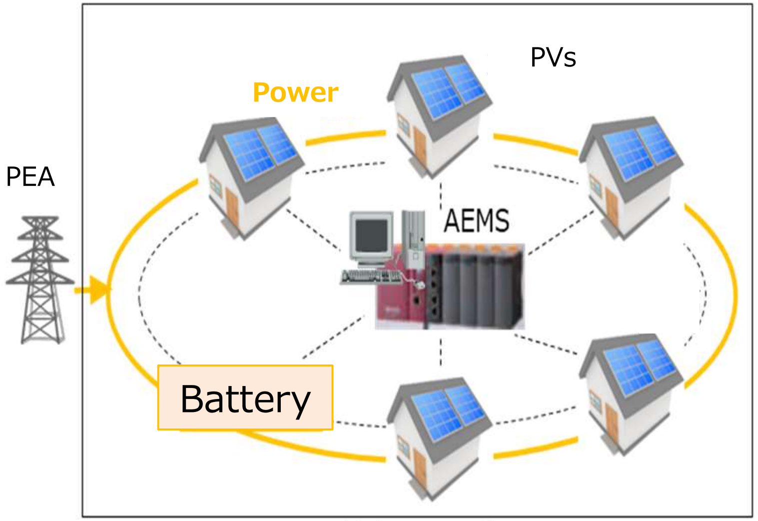


Proposed service route for demonstration

2． Consideration of Smart Grid in Detached Houses for Sale

In the NEDO’s survey project, this software was utilized for the examination of Smart Grid systems (solar power + battery systems) in residential housing developments.

System



Microgrid

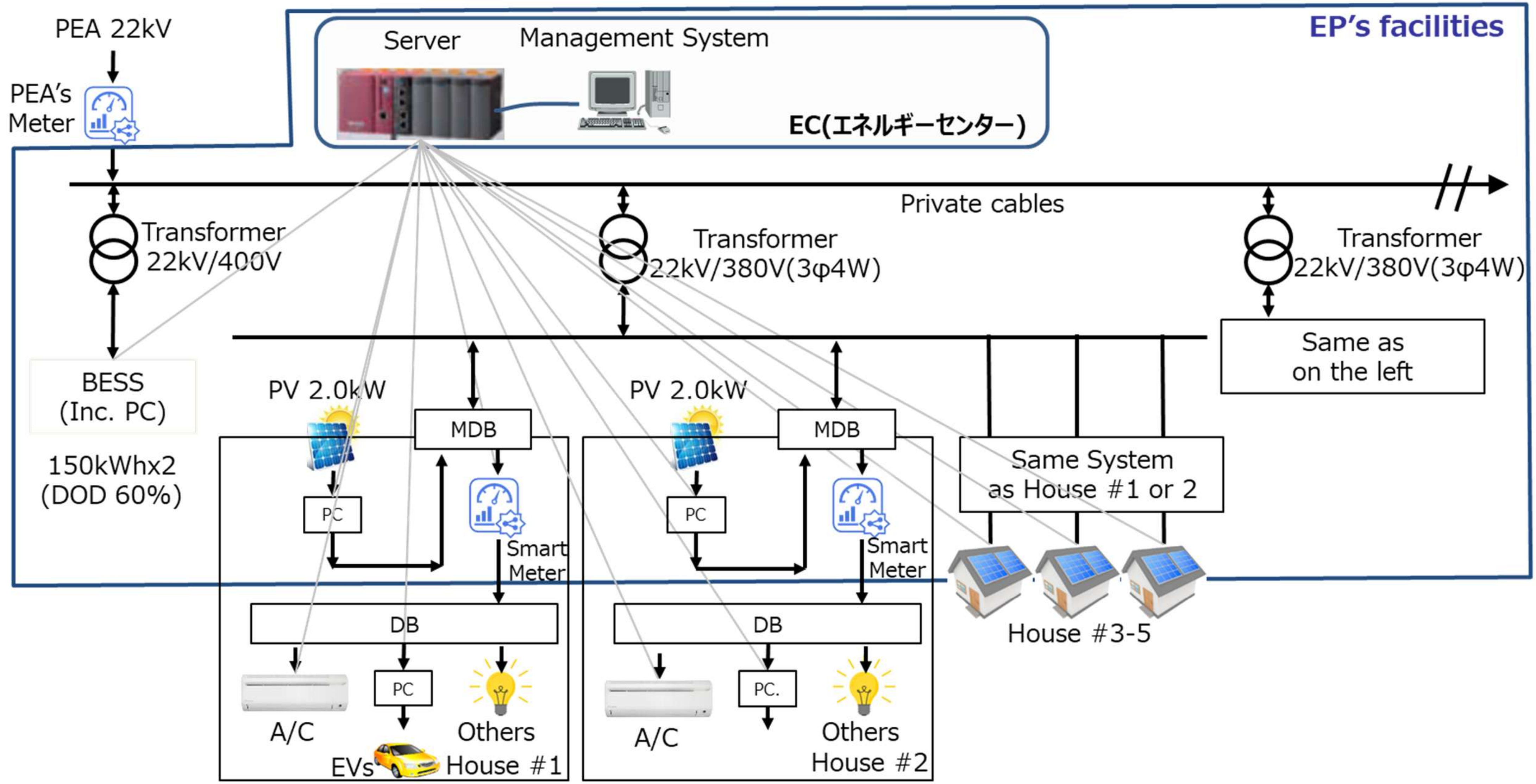
Visualization

INV Room ACs

- District energy providers(EP) install PV panels on each house’s roof (standard equipment for all homes) at their own expense, leasing the roof space.
- EP generates clean electricity and sell it to the residents. Within the housing complex, a self-operated microgrid, large-scale battery storage, and an Energy Management System (EMS) intelligently manage its power demand.
- Visualizing power consumption reduces electricity consumption in cooperation with residents. High-efficiency air purifying inverter air conditioners are offered to residents via subscription, minimizing their cost burden."

Energy Simulation Consulting supported by Japanese Government③

a. Configuration of Microgrid

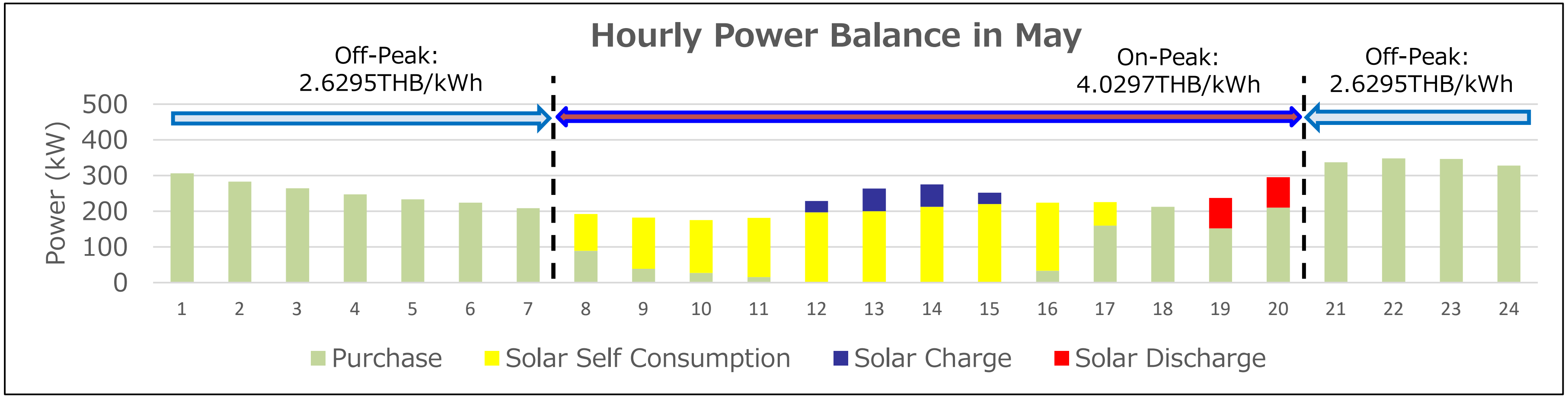


Energy Simulation Consulting supported by Japanese Government④

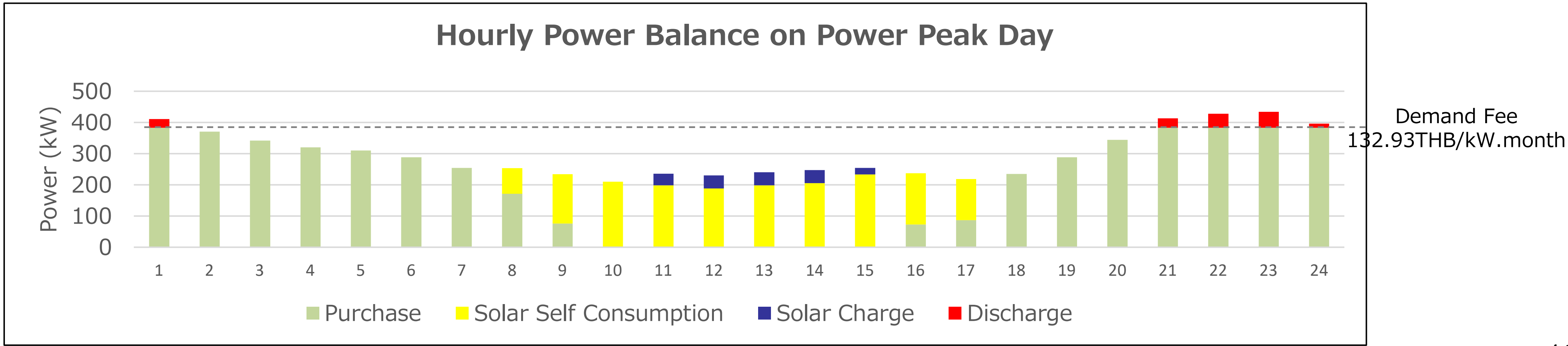
b. Energy Simulation Results

◆Hourly Situation of Solar Panels and Batteries (2 types of Operation)

・Peak Shift Discharge



・Peak Cut Discharge



Engineering
for Tomorrow
with Enepro21 World Edition

E.I. Engineering Co., Ltd.

2-10-18, Asahidori, Kobe Chuo-ku, Hyogo 651-0095 Japan
Tel: 078-222-8250 Fax: 065-222-8258
Email : support@eie-e.com
https://www.eie-e.com