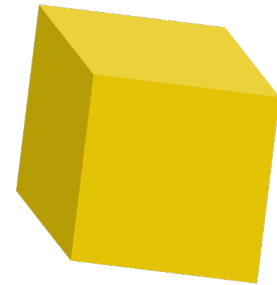




TOMAS TECH

Energy Management System Pegasus



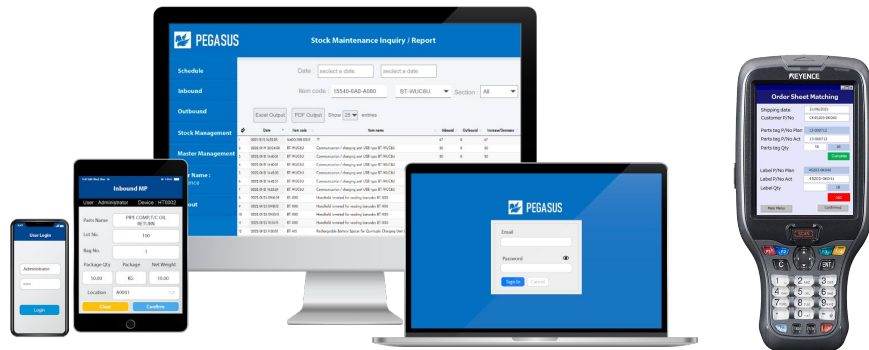
Presentation by TOMAS TECH CO., LTD.

AGENDA

- 1. Overview of the Energy Management System**
- 2. Details of the Energy Management System**
- 3. Appendix**

Overview of the Energy Management System

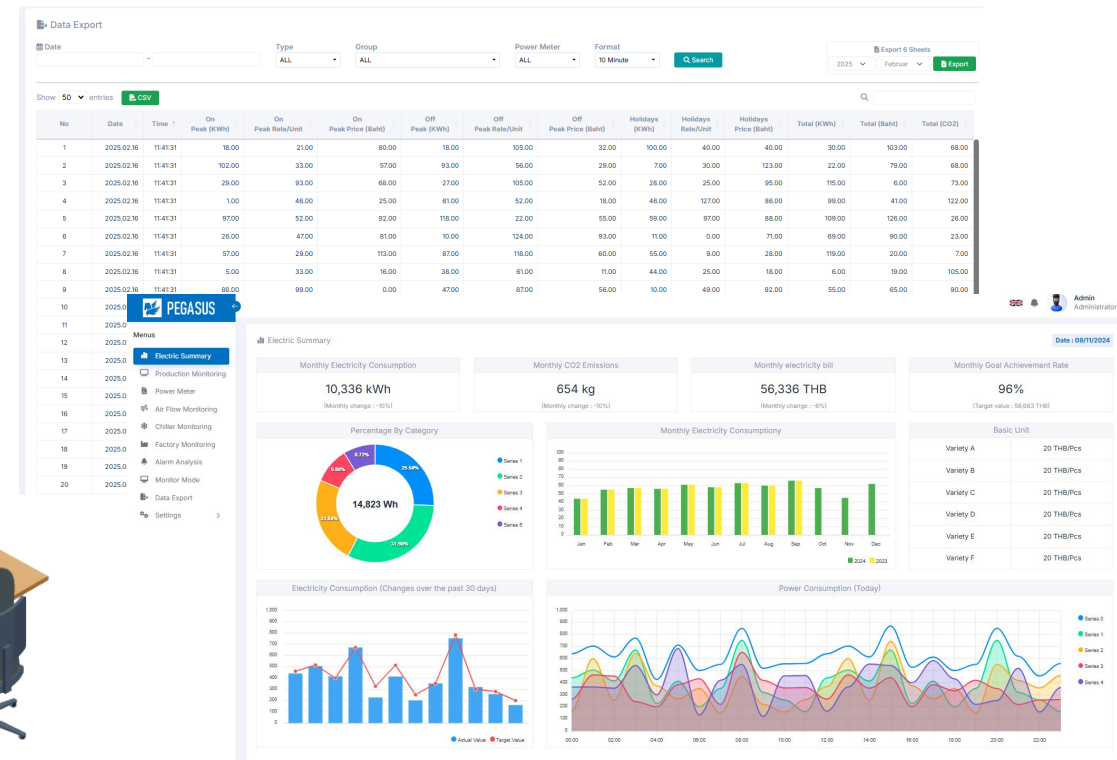
The PEGASUS Production Management System is **an application designed to streamline complex management tasks**. In recent years, the manufacturing and logistics industries have faced increasing demands to adapt to diverse market needs through **small-batch, high-variety production and shortened lead times**. Many factories handle both high-volume production and small-lot orders simultaneously, making management tasks even more complex and **requiring meticulous scheduling and inventory control**. PEGASUS was developed to improve operational performance in manufacturing and logistics settings. By utilizing Handy Terminal, it digitalizes the previously cumbersome management tasks that were often handled through whiteboards and Excel, providing **complete visibility and significantly reducing costs**.



Stock Management 	Process Management 	Sales Order Management 	Fixed assets management
Stocktaking system 	POKA Inspection system 	Traceability system 	Unlock system
Operation monitoring system 	Weight checker system 	Label printing system 	RFID system

Overview of the Energy Management System

The Energy Monitoring System PEGASUS is a tool that **collects and analyzes various energy consumption data in real-time within the factory**. Using sensors throughout the factory, it captures detailed information on energy-related factors such as flow rate, air volume, power, voltage, water pressure, and water volume, and provides total monitoring. Additionally, it **calculates carbon emissions from power consumption data and manages emissions by scope and category**. The system also displays the impact of in-house power generation and reduction activities, supporting energy optimization and sustainable operations.



1

Lack of Energy Consumption Visualization

If energy usage within the facility is not visualized, it becomes difficult to accurately monitor the energy consumption of each piece of equipment. As a result, energy waste may go unnoticed, and it may become difficult to identify concrete improvement measures for enhancing energy efficiency.



Visualization of Energy Consumption

By visualizing the energy usage within the factory in detail, you can identify which equipment is consuming how much energy. This enables the discovery of energy waste and helps find solutions for efficiency improvements.

2

Inadequate Calculation and Management of Carbon Emissions

If carbon dioxide emissions are not automatically calculated from energy data, accurate assessment becomes difficult, leading to insufficient environmental management and delayed sustainability efforts. This raises concerns about corporate social responsibility and meeting environmental goals.



Visualization of Energy Consumption

The system automatically calculates carbon dioxide emissions from energy consumption data and manages them by scope and category. It supports efforts to achieve environmental goals and enhances the sustainability of the company.

3

Challenges in Achieving Cost Reduction

If energy consumption is not optimized, unnecessary costs may accumulate. In manufacturing, where energy is a major expense, missed cost-saving opportunities make overall expense reduction more challenging.







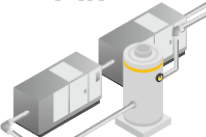




Achieving Cost Savings

By optimizing energy consumption, unnecessary costs can be reduced. This is especially beneficial for manufacturing industries where energy costs represent a significant portion, greatly contributing to overall cost savings.

Details of the Energy Management System

Facilities

Production Line 	Air Conditioning 
MDB/MCCB 	Lighting 
Chillers 	Boilers 
Air 	Gas·Water·Oil 



Electric Power



Air (Gas)



Air (Gas)



Collection Unit



Server



Dashboard

01

Collection of Information from Various Sensors

Sensors can be selected based on the data type to be visualized—electricity, air (gas), or liquid—enabling digitization.

Electricity: Visualize power consumption at main panels, sub-panels, and equipment levels.

Air: Track air usage from the main compressor to each endpoint.

Liquid: Monitor factory liquid flow rates, including water, oil, and cutting oil.



Electric Power



Air (Gas)



Water (Liquid)

02

Real-Time Visualization of Energy Consumption

By visualizing energy usage in detail within the factory, it becomes possible to identify how much energy each piece of equipment is consuming. This enables the identification of energy waste and the formulation of improvement measures for enhanced efficiency. Since management can be divided by factory or production line, a more detailed understanding of the situation is achievable.



03

Calculation of Carbon Emissions and Cost Management

Carbon emissions can be calculated from energy data and managed by scope and category. Using electricity unit prices per kWh, cost estimation is possible. By registering production quantity, emissions and costs per product can also be tracked.



The dashboard provides a clear real-time energy summary.

Current trends and past consumption are analyzed using a dual-axis approach.

Energy usage can be assessed by factory, process, or equipment over time.



Introduction to the Energy Management System Functions

Power consumption can be compared across different factories and production lines.

Comparison with past energy consumption data is also possible, enabling high-resolution analysis.



Introduction to the Energy Management System Functions

Past power consumption data can be viewed as historical records.

By exporting the data into reports such as Excel, it can be utilized for analysis and internal reporting purposes.

Data Export

Date: [] ~ [] Type: ALL Group: ALL Power Meter: ALL Format: 10 Minute [Search]

Export 6 Sheets: 2025 Februar [Export]

Show 50 entries [CSV]

No	Date	Time	On Peak (KWh)	On Peak Rate/Unit	On Peak Price (Baht)	Off Peak (KWh)	Off Peak Rate/Unit	Off Peak Price (Baht)	Holidays (KWh)	Holidays Rate/Unit	Holidays Price (Baht)	Total (KWh)	Total (Baht)	Total (CO2)
1	2025.02.16	11:41:31	18.00	21.00	80.00	18.00	105.00	32.00	100.00	40.00	40.00	30.00	103.00	68.00
2	2025.02.16	11:41:31	102.00	33.00	57.00	93.00	56.00	29.00	7.00	30.00	123.00	22.00	79.00	68.00
3	2025.02.16	11:41:31	29.00	93.00	68.00	27.00	105.00	52.00	28.00	25.00	95.00	115.00	6.00	73.00
4	2025.02.16	11:41:31	1.00	46.00	25.00	61.00	52.00	18.00	46.00	127.00	86.00	99.00	41.00	122.00
5	2025.02.16	11:41:31	97.00	52.00	92.00	118.00	22.00	55.00	59.00	97.00	88.00	109.00	126.00	26.00
6	2025.02.16	11:41:31	26.00	47.00	81.00	10.00	124.00	93.00	11.00	0.00	71.00	69.00	90.00	23.00
7	2025.02.16	11:41:31	57.00	29.00	113.00	87.00	118.00	60.00	55.00	9.00	28.00	119.00	20.00	7.00
8	2025.02.16	11:41:31	5.00	33.00	16.00	38.00	61.00	11.00	44.00	25.00	18.00	6.00	19.00	105.00
9	2025.02.16	11:41:31	88.00	99.00	0.00	47.00	87.00	56.00	10.00	49.00	92.00	55.00	65.00	90.00
10	2025.02.16	11:41:31	59.00	12.00	23.00	96.00	42.00	108.00	40.00	75.00	103.00	9.00	89.00	74.00
11	2025.02.16	11:41:31	28.00	34.00	96.00	88.00	110.00	116.00	74.00	17.00	56.00	110.00	40.00	74.00
12	2025.02.16	11:41:31	4.00	3.00	16.00	49.00	48.00	38.00	34.00	6.00	8.00	86.00	128.00	37.00
13	2025.02.16	11:41:31	130.00	11.00	10.00	84.00	17.00	107.00	36.00	17.00	13.00	91.00	99.00	72.00
14	2025.02.16	11:41:31	125.00	33.00	51.00	90.00	88.00	116.00	90.00	71.00	16.00	10.00	58.00	77.00
15	2025.02.16	11:41:31	111.00	24.00	27.00	81.00	119.00	2.00	54.00	127.00	43.00	5.00	16.00	105.00
16	2025.02.16	11:41:31	22.00	20.00	123.00	24.00	41.00	31.00	36.00	4.00	33.00	18.00	111.00	14.00
17	2025.02.16	11:41:31	90.00	21.00	13.00	42.00	30.00	95.00	69.00	118.00	48.00	88.00	27.00	65.00
18	2025.02.16	11:41:31	62.00	68.00	5.00	120.00	38.00	85.00	18.00	26.00	114.00	76.00	44.00	94.00
19	2025.02.16	11:41:31	89.00	13.00	42.00	54.00	22.00	114.00	59.00	75.00	21.00	2.00	7.00	70.00
20	2025.02.16	11:41:31	44.00	116.00	115.00	46.00	120.00	102.00	25.00	71.00	58.00	28.00	119.00	94.00

Introduction to the Energy Management System Functions

By mastering each piece of power information, highly flexible master settings can be achieved.

By creating combinations for each production line, power consumption can be aggregated per line.

Manage Group Power Meter

[Manage Type Group](#) [Delete Group](#) [+ Add Group](#)

[CSV](#) [Import CSV](#) [Edit](#)

Group	Type	Remark	MDB-1	LP-OF1	LP-1	LP-2	MP-1	PP-7	MP-U1	MPOF	MP-2(G)	MP-U2(G)	MDB-2	MP-COMP	DB4	MDB-3	MDB-4	LP-F1	LP-F2	LF-APC1	LF-APC2	LF
Office	Factory1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lighting	Factory2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air compressor	Air		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prod Machine	select type		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air condition	Air		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grinding	Factory1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assembly	Factory1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

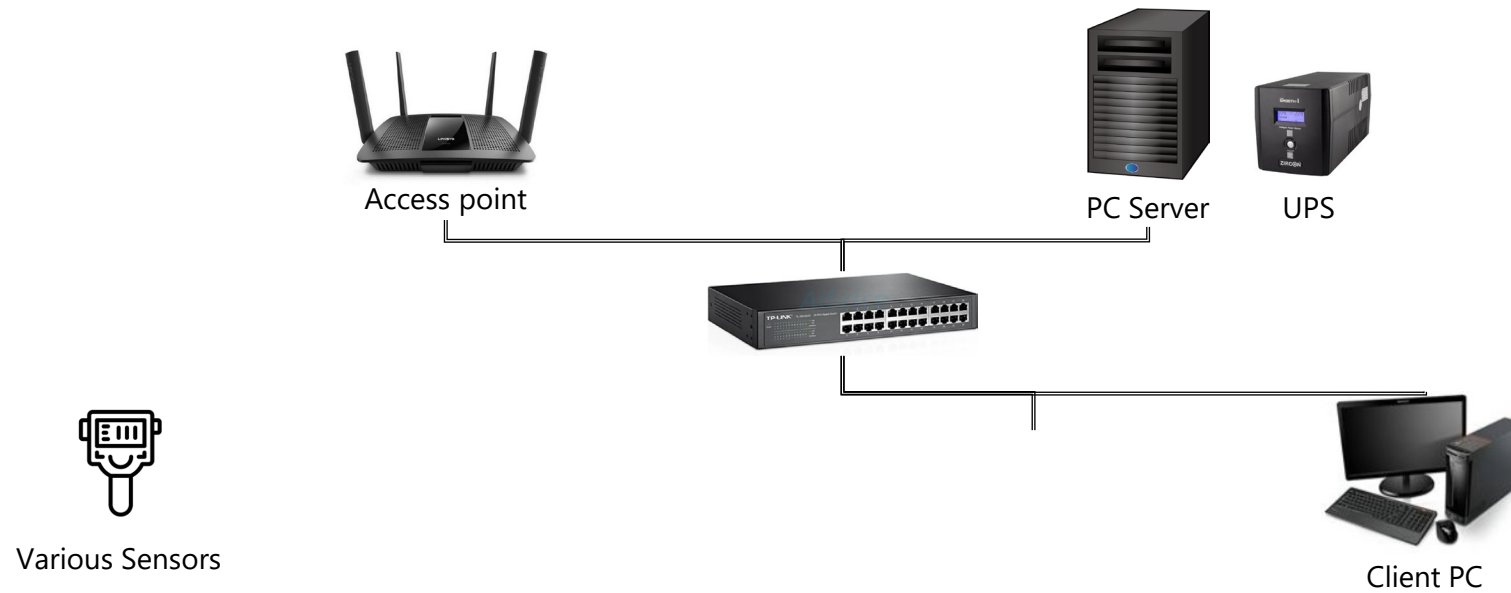
Manage Power Meter

[Manage Sub Power Meter](#) [Delete Power Meter](#) [+ Add Power Meter](#)

[CSV](#) [Import CSV](#) [Edit](#)

Power Meter	COMP	MP-COMP2	MDB-COMP3	P-4-2	P-4-5(AC-2/4)	P-4-6(AC-2/5)	P-4-1(AC-2/6)	AC-3/1(AC-3/2)	P-1-2	P-1-3	P-1-4	P-1-5	P-1-6	P-1-7	P-1-8	P-1-9	P-2-1
MDB-1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LP-OF1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LP-1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LP-2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MP-1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PP-7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MP-U1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MPOF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MP-2(G)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MP-U2(G)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MDB-2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MP-COMP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix



No	Item	Recommended specifications and models
1	PC Server	OS: Windows Server 2019R2Standard / Memory: 8 GB or higher /Hard disk: Free space of 50 GB or higher / Display: Resolution 1366 x 768 or higher / Browser: Google Chrome (latest version) *Server machine with recommended model specs or higher
2	Client PC	OS: Windows7/8.1/10 / Memory: 4GB or more / Display: Resolution 1366×768 or more Browser: Google Chrome (Latest version) *PC machine with recommended model specifications or higher
3	UPS	UPS shutdown signal type
4	Various Sensors	Selection on a Case-by-Case Basis

1. Current Situation Analysis	We will conduct interviews to gather information about the current business operations and the systems in use. This will allow us to confirm requirements and analyze the customer's current situation. Based on these requirements, we will prepare a quotation.	Within sales
2. Requirements Definition	Based on the results of the current situation analysis, we will conduct a detailed requirements definition. We will verify the detailed requirements to ensure that the system can be implemented in line with actual operational needs.	1-8 weeks
3. Design	We will conduct design activities, including basic design, detailed design, and migration preparation, based on the requirements while holding progress meetings.	1-3 weeks
4. Development and Testing	We will develop the system to fit your business needs and proceed to testing. To ensure a smooth implementation, we will also consider migration methods.	1-12 weeks
5. Implementation Support	During the implementation, we will conduct training sessions while operating in parallel with the currently used system or processes. After confirming the user experience, we will proceed with the final acceptance inspection.	1 week
6. Go-Live	The system will officially start operation. We will provide long-term support for safe and comfortable system usage through operational maintenance support, helpdesk services, information provision, and updates.	Min : 4 weeks Max : 24 weeks

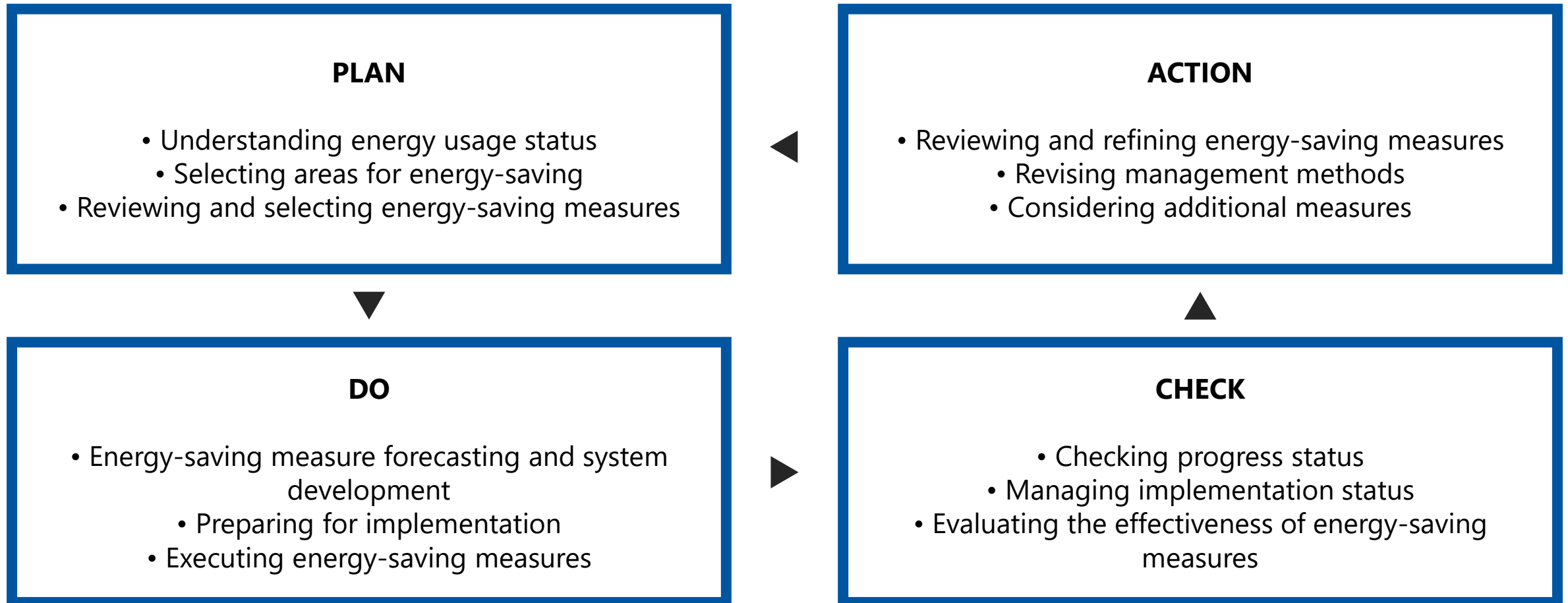
#	Software Maintenance		Standard / Option
1	Operation Support and Recovery Assistance	We will establish a support contact to provide operational support via phone and email, as well as recovery assistance in the event of software malfunctions.	Standard*1
2	Providing updated software versions	Upgraded software versions will be provided at no cost when improvements are made, ensuring compatibility with the latest operating systems. This eliminates software costs for server updates, reducing lifecycle expenses.	Standard*1
#	Hardware Maintenance		
1	Hardware Maintenance	In the event of a server failure, our company or the hardware manufacturer will carry out on-site repairs, including parts replacement.	Option*2
#	Software Reinstallation		
1	Software Reinstallation	In the event that software reinstallation is required after server repair, we will carry out the restoration process. (Please note that stock data recovery is not included in the software reinstallation.)	Standard*1

*1) Services will be provided at the system purchase price for the first year of the contract. Starting from the second year, contracts will be on an annual basis.

*2) Services will be provided only if hardware is purchased from our company.

Energy saving is extremely difficult to balance with costs, and without careful planning and execution, not only will the desired results not be achieved, but it may also lead to significant losses.

Therefore, it is crucial to manage energy consumption and promote the PDCA cycle for energy saving to implement effective and waste-free measures.





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