TEPCO DX White Paper 2025

TEPCO

Tokyo Electric Power Company Holdings, Inc.

TEPCO DX White Paper 2025

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Examples of Transformation

Foundation for DX Promotion

On TEPCO DX White Paper

The TEPCO Group will pioneer the future of energy through the AI shift

We recognize generative AI, which has evolved rapidly in recent years, has the potential to become the “catalyst for change” that will give a social impact comparable to the invention of electricity.

The TEPCO Group has begun widespread utilization of generative AI in various work, including advanced safety and risk measures, accumulation and sharing of technical know-how, and quality improvement through support for the application of laws and regulations. Moving forward, we will further evolve these efforts toward rebuilding work processes and organizational design with AI agents as a prerequisite and promote business innovation and initiatives to cultivate transformation-ready talent, in other words, the AI shift. While being a major challenge for us, it will become the first step toward a future where humans and AI advance together.

In addition, we are actively promoting the utilization of digital technology as “Decommissioning DX” in our social mission of decommissioning of Fukushima Daiichi Nuclear Power Station. Through this, we aim to achieve security and safety of workers and the local communities and steadily realize the decommissioning roadmap. Furthermore, we will also engage in technical development aiming for the automation of work by “physical AI (robotics)”, which autonomously operates in physical space, in the future.

This DX White Paper introduces various achievements of DX measures thus far. Cases such as ZEB (net-zero energy building) as a decarbonization measure for existing buildings clearly demonstrate actual results of business transformation and effectiveness leveraging digital capabilities.

Defining TEPCO DX as “driving the realization of a zero-carbon energy society”, we are deepening the “one-stop power model*1” and advancing the acquisition of the “transition partner business model*2”. Furthermore, we are also advancing comprehensive and thorough digitization with the social data infrastructure “Zero Carbon Energy Data Hub”. Through these initiatives, we will continue to transform the business structure under the mission of achieving both stable power supply and carbon neutrality.

The TEPCO Group will continue to pioneer the future of energy through business transformation and human resources fueled by digital technology and by shifting to AI for transformation in the entire energy value chain, together with stakeholders and partners.

Tokyo Electric Power Company Holdings, Inc.
Managing Executive Officer
Chief Information Officer
and Chief Information Security Officer

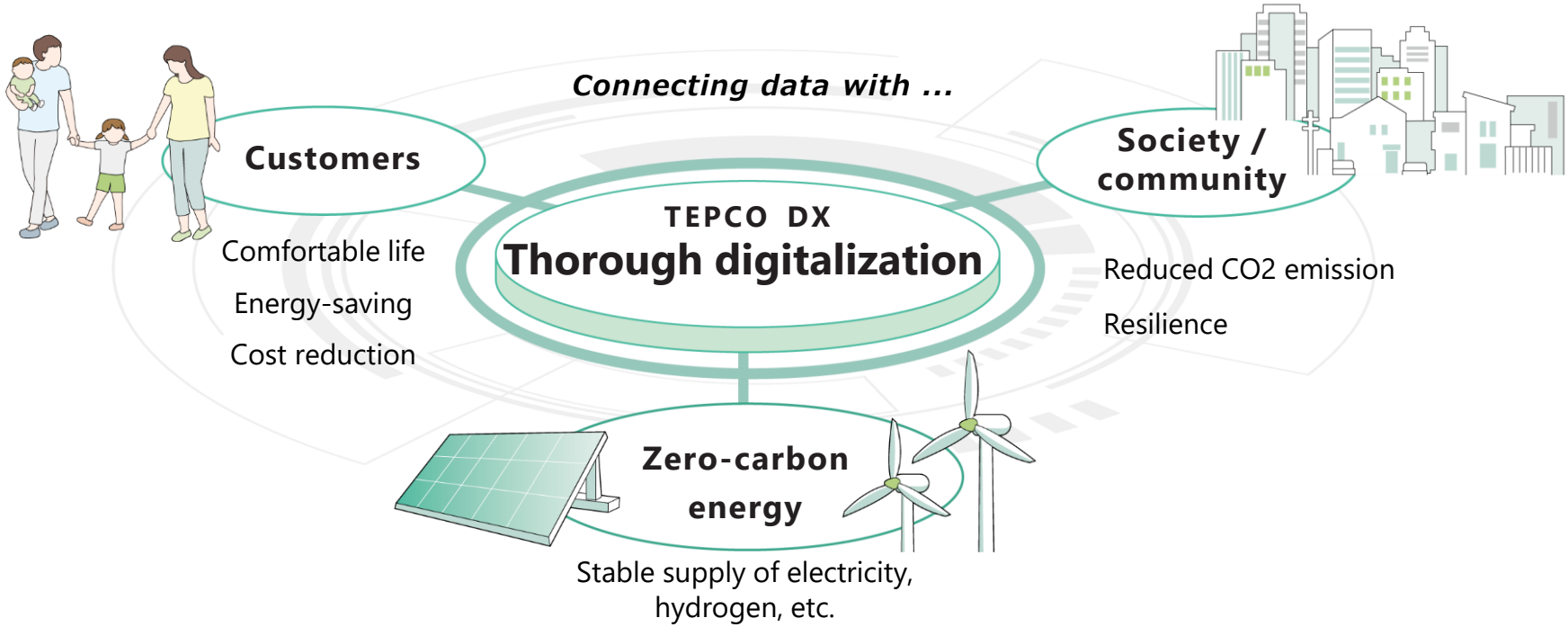
*1: Existing electricity business *2: Co-creation business for transition to a carbon-neutral society

Direction of transformation through DX

- TEPCO DX drives the realization of a sustainable zero-carbon energy society through thorough digitalization
- Stable supply of zero carbon energy, comfortable life for customers, and reduced CO_2 emission and resilience for the society and community are realized

TEPCO DX

Drives the **realization of a zero-carbon energy society** through thorough digitalization



Goal Mitigate global warming and drastic climate change, and maintain biodiversity

Business transformation and business model realized through digitalization

- Transform into data-driven business operations through thorough digitalization
- Refine the conventional one-stop power business model, and acquire the transition partner business model to realize a zero-carbon energy society
- Zero Carbon Energy Data Hub is built as an infrastructure to distribute data on zero-carbon energy society, which provides data and services

Concept

Before DX

Complement experience and know-how with data

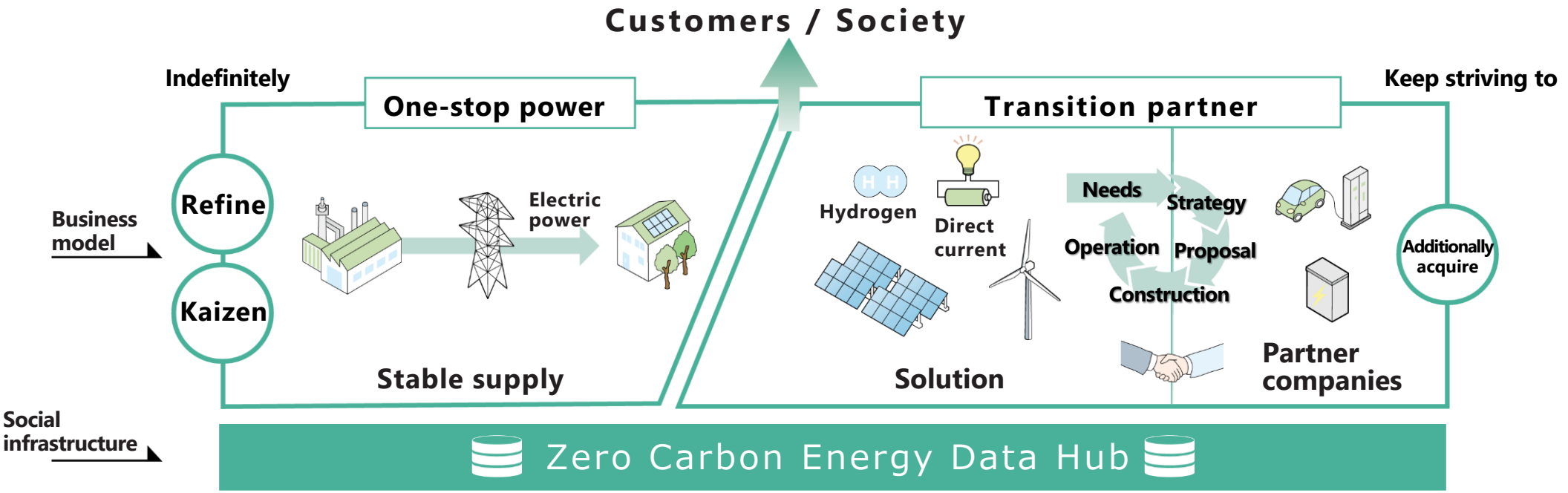
+D → D+

After DX

Business operations with thorough digitalization

Data-driven business operations

Outline of business model aimed for by TEPCO DX



Examples of provided values through thorough digitalization

Stable Supply

- Shortening of facility shutdown period due to prediction of facility failure
- Improvement of operability through data utilization
- suppression of increased emission of CO_2

Cost reduction

Streamlining / Optimization

- Shifting resources to transformation activities and new carbon-neutral businesses by formalizing know-how and experience

Increased profit

Well-being

- Zero personal injuries due to elimination of unsafe actions based on accident cases
- Employee happiness through connections with colleagues who share common thoughts and feelings

Employee satisfaction

Connecting data with …

Realization of zero-carbon energy society

Surprise / Awareness

- Proposal of carbon-neutral products and services by estimating individual needs from attribute, facility, action and history data
- Diagnostic chart on what to do based on owned products, actual results and CO2 emissions

Increased sales / Customer satisfaction

Security / Safety

- Regional disaster prevention and ensuring safety by coordinating information on disasters, rainfall, etc.
- Real-time distribution of operation data and footage of nuclear facilities

Gaining trust

Collaboration

- Energy data linkage with prosumers and operators, social implementation of locally produced and consumed Area EMS[*1] in a decarbonized region
- Business creation through real-time DER[*2] control and aggregation[*3]

Market creation

＊1：Energy Management System (System that monitors and optimally controls energy usage)
＊2：Distributed Energy Resources (Power sources distributed across multiple locations. Solar power, wind power, storage battery, etc.)
＊3：Efficient energy management by bundling multiple distributed power sources and consumers

Five action guidelines

- Set action guidelines for each employee to ensure realization of transformation through “data”

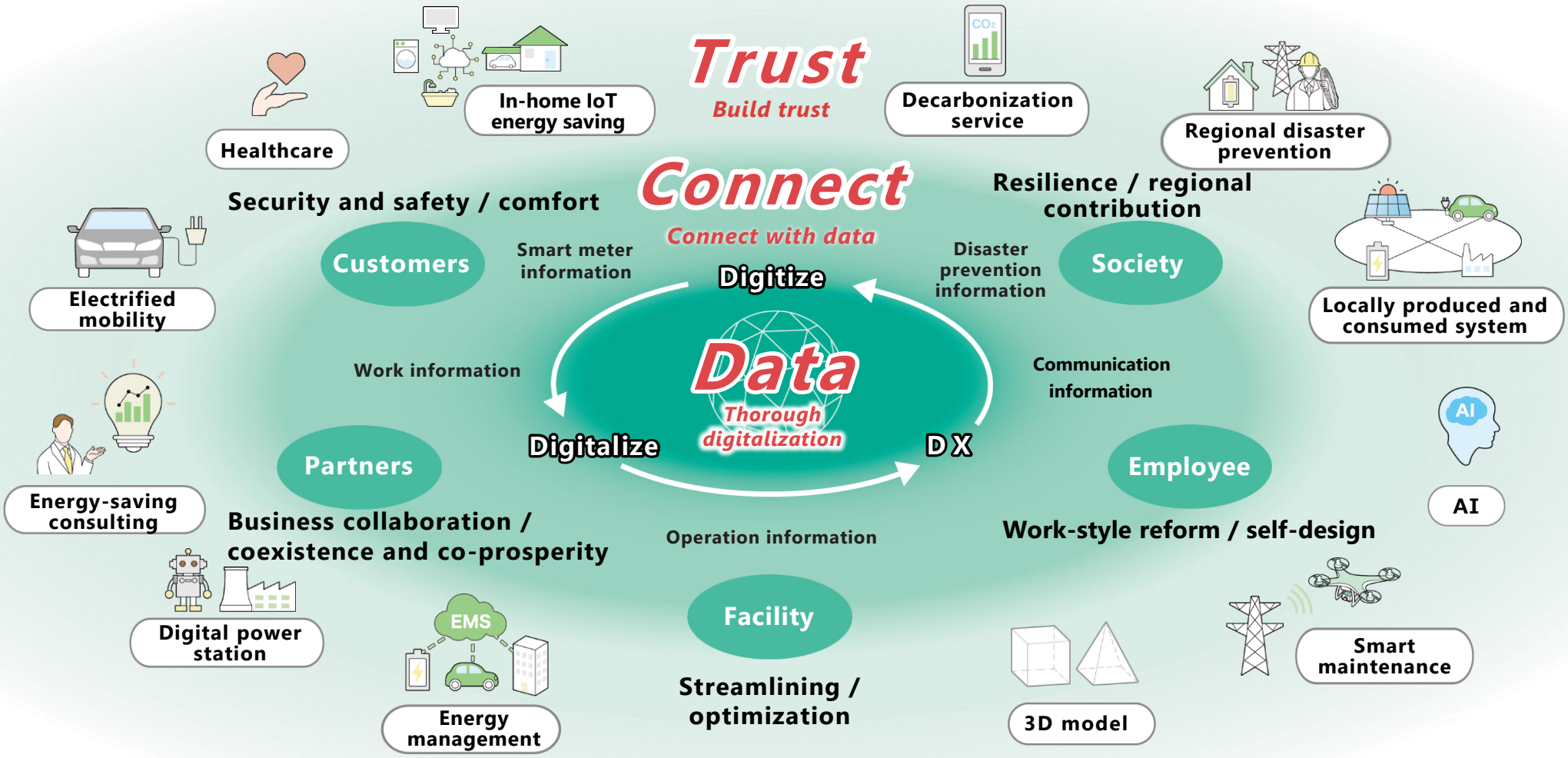
5 articles of transformation

1. Thoroughly convert work operations into data, **believing the power of data**
2. **Speak with data** to make decisions that depart from intuition, knack and guts
3. **Connect with colleagues and partners** crossing departmental boundaries with the common language of “data”, and exchange ideas to co-create values
4. Build **trust of the society and customers** with transparent data
5. **Each and every person is involved.** Believe in data when taking action, and unlock yourself from customs

TEPCO DX vision

Connect with internal and external parties as well as customers (Connect) through thorough digitalization (Data) and gain trust of the society (Trust), thereby expanding new businesses such as decarbonation services (realization of business structure transformation)

Mitigate global warming and drastic climate change, and maintain biodiversity



Achieving both Fukushima revitalization and decommissioning

Ensuring nuclear safety

TEPCO DX roadmap

2050 Substantially zero CO2 emissions from energy supply

Transform the business structure to achieve both long-term stable supply and carbon neutrality

2030 Reduction of CO2 emissions from electricity sales by 50%
(compared to FY2013)

Trust
Build trust

Decarbonization solutions based on co-creation

- Creation of highly value-added services through cross-industrial alliances
- Next-generation city planning through advanced energy management
- Zero Carbon Energy Data Hub as a social infrastructure

Connect
Connect with data

Resilient energy value chain

- Improvement of customer services utilizing advanced technology
- Strengthening of energy network utilizing real-time data
- Regenerative energy as the main power source through smart power generation

Data
Thorough digitalization

Acquisition of competitive power through human resources and cultural reforms

- Promoting value demonstration through the right talent, in the right place and at the right time
- Development of DX talent through reskilling of "D" and "X"
- Development of an environment for all-employee participatory transformation activities

Promotion of development of digital foundation

- Building of digital service platform and democratization of data
- Revamping of legacy system and integration of data
- Ensuring cyber security by a specialized organization

Transformation of human and organizational culture → **Transformation of business** → **Contribution to the society**

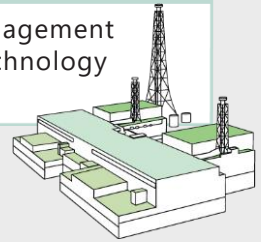
Examples of Transformation

00 Examples of transformation through TEPCO DX

Power generation | **Power transmission and distribution** | **Demand**

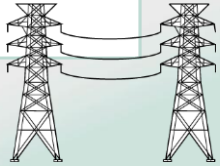
Nuclear power

- Advanced facility management utilizing 3D model technology … **P14**



System

- Advanced substations utilizing cutting-edge digital technology … **P17**
- Advanced maintenance of power transmission and distribution facilities utilizing drones … **P18**



Comfortable life

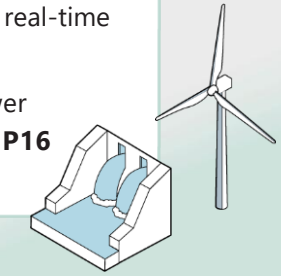
- CX/EX innovation and Advanced contact center driven by generative AI… **P19**

Solutions

- ＋ Promotion of ZEB service utilizing EMS, etc. … **P13**
- Development of healthcare service utilizing power data and AI … **P20**
- Development of CN promotion service through use of energy data … **P21**

Renewable energy

- Accelerated restoration and maximized power generation through real-time management … **P15**
- Smart maintenance of power stations utilizing drones … **P16**



One-stop power

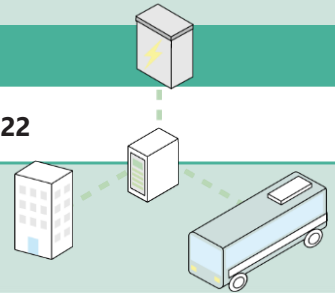
Resilient energy value chain

Transition partner

Decarbonization solutions based on co-creation

Next-generation city planning

- Building a next-generation community utilizing Area EMS … **P22**



Generative AI

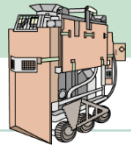
＋ Field safety assessment by generative AI, Building of knowledge sharing platform … **P12**

Zero Carbon Energy Data Hub

Decommissioning

＋ Utilization of digital twins and infrastructure development in decommissioning site … **P10**

＋ Development and utilization of remotely operated robots for extreme environments … **P11**



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01 Utilization of digital twins and infrastructure development in decommissioning site

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- Utilization of digital technology is actively promoted to decommission safely and steadily, which is the mission of the TEPCO Group
- On-site conditions, including presence of obstacles, are grasped and utilized to review work plans, by creating 3D models of the interior of high-dose buildings using robots, etc.
- The aim is to create 3D models of the entire site and develop digital twins in the future, by establishing the infrastructure for acquired data and integrating various information

Key points of the initiative

3D modeling

☐ 3D modeling of the site by utilizing four-legged walking robots, 3D scanners and drones and acquiring field footage and point cloud data

Simulation utilizing models

☐ Trainings are implemented utilizing MR*1 based on 3D models. Both safety and training quality are improved by drastically reducing moving and preparation time.

☐ Advanced construction simulation by mapping various information

Prospects of the initiative

Organization of information infrastructure by developing digital twins

☐ 3D model of the entire site is created and development of digital twins incorporating high-dose areas and construction plan data is envisioned

☐ The aim is to the improve work efficiency by "bringing the field to the desk" by developing an environment where the conditions of the field can be centrally grasped in digital space

Four-legged walking robot "SPOT"

- The surrounding is scanned with the mounted sensors to acquire point cloud data, etc.

Data acquisition

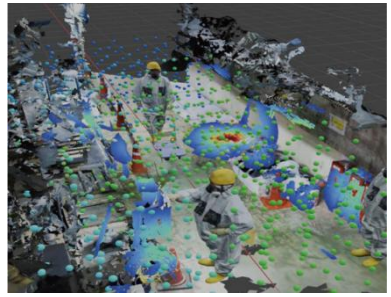
3D model of the site

- Actually created 3D model of the site

Training utilizing MR

- Training using MR of large suction truck

Digital twin (image)



- Various information is centralized by incorporating equipment information into the created 3D model

*1: Mixed Reality; augmented reality technology that merges the real world with the virtual world

02 Development and utilization of remotely operated robots for extreme environments

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- Robots to work in decommissioning environments where it is difficult for humans to enter, such as high-dose areas and underwater, are developed and utilized
- Actual introduction in the field is being promoted after a period of thorough verification with 3D data acquired in advanced and mock-up environments

Key points and prospects of the initiative

Safe decommissioning work is realized in severe environments

☐ Data acquisition and remote verification and operations are realized in the field of decommissioning where human access is limited, such as high-dose areas, rough paths and underwater

☐ Worker safety and work speed are improved assuming remote operation by robots for high-dose work across all ranges from light work to heavy work in the future

Joint development and field introduction with subsidiaries and affiliated companies

☐ Zeolite*1 collection robot is jointly developed with Hakusan Corporation (mainly Hyper-Environmental Robots Laboratory)

☐ Ancillary equipment of the zeolite collection robot is designed and introduced in the field, and introduction of four-legged walking robots and underwater survey robots is verified and implemented in the field by Tokyo Power Technology Ltd. which is a subsidiary of TEPCO

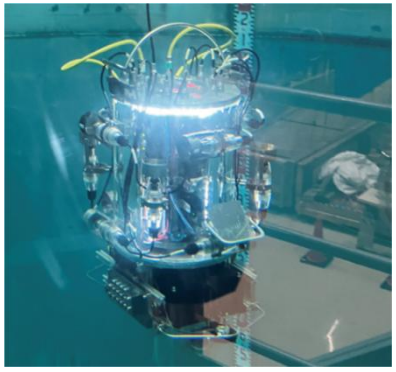
Zeolite collection robot "Accum"

- High-dose zeolite sandbags that have adsorbed radioactive cesium inside buildings can be collected
- Developed in-house to adapt to special environments where human access is not possible due to high dose
- Collection work inside the high temperature incinerator building began in March 2025

Four-legged walking robot "SPOT"

- Capable of executing fine movements such as measuring dose, collecting samples and opening/closing doors
- Works at decommissioning sites for its excellent off-road capability

Underwater survey robot "Rad Hotaru IV"



- Underwater remote-controlled robot that achieves both compact size and water pressure resistance is utilized to measure the thickness of the bottom plate of the tank where ALPS treated water is accumulated
- Jointly developed with the National Institute of Technology, Fukushima College

*1: Mineral that possesses the property of adsorbing radioactive materials such as cesium

03 Field safety assessment by generative AI and building of knowledge sharing platform

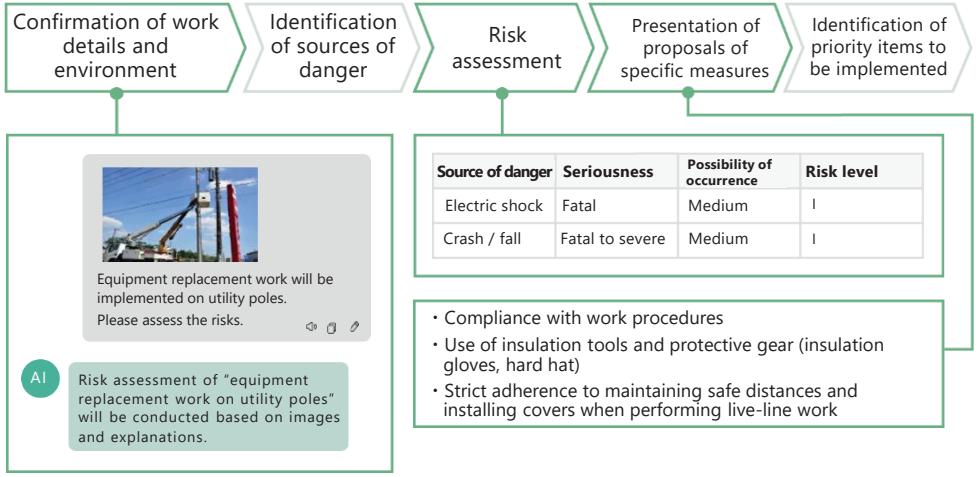
Tokyo Electric Power Company Holdings　TEPCO Power Grid

- Generative AI is utilized to solve key issues in the field such as safety measures and transfer of knowledge
- More intuitive and simplified usage is enabled by enhancing usability in the field through UI*1 and UX*2 improvements, such as supporting various input formats such as photos and audio in addition to text

Key points and prospects of the initiative

Field safety assessment and risk detection are supported with generative AI

Initiative of the safety promotion division (Safety Now)



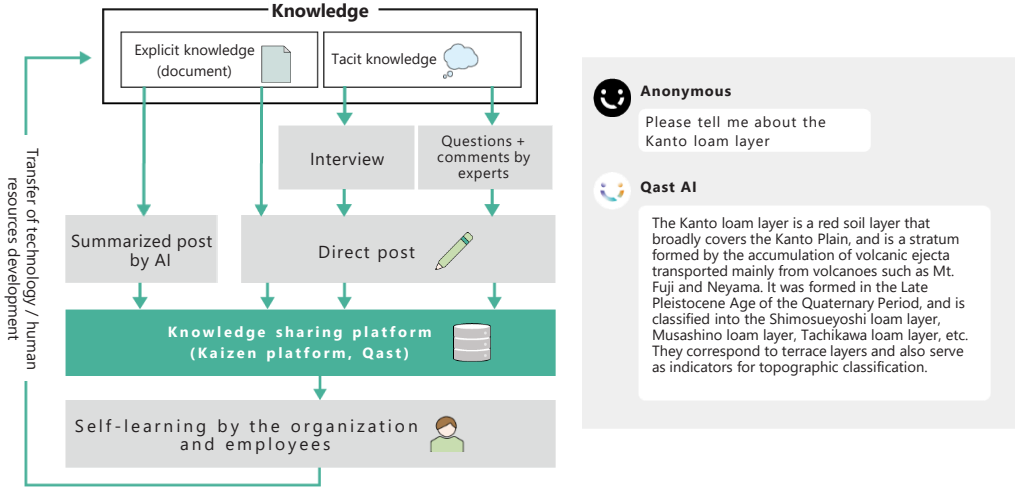
☐ A system to support risk assessment is deployed, in which information from work sites (text, photos, audio, etc.) is input into generative AI. The system references past internal and external disaster and near-miss incident cases, relevant laws and regulations, and safety-related materials to identify potential risks

☐ UI and UX improvements, such as photo and voice input, and "chat consultation" function that answers basic questions on safety are introduced to improve usability in the work sites

☐ In the future, accumulated organizational knowledge will be linked with checklists, reports and construction plan formats, and causes and measures will be analyzed by AI based on occurrence of disasters and near-miss incidents. The aim is to improve company-wide safety awareness by sending alerts to similar work sites

Knowledge is built on RAG foundation*3 to contribute to organizational knowledge management

Initiative of the civil and architectural engineering division (Qast)



☐ The nuclear power division and power distribution civil engineering division promote formalization and institutionalization of tacit knowledge held by individuals, in addition to documents serving as explicit knowledge, through interviews, relay talks and other accumulation activities. They are reflected in RAG foundation to enable searches, questions and summaries through AI chat

☐ Through this initiative, especially experience and technical capabilities of employees with advanced expertise in licensing procedures, seismic design of facilities and specialized construction techniques are efficiently transferred as knowledge across generations to members. Time created through Kaizen initiatives also contributes to revitalizing study sessions, trainings and research activities

☐ Intergenerational knowledge exchange is promoted through mechanisms such as internal experts answering questions from employees, and management is also strongly involved in transfer of technology and human resources development, which are key management issues. Looking ahead, further expansion across departments is planned

*1: User Interface; operation screen and design of the service, system, etc.

*2: User Experience; experience by users in the process of using the service

*3: Retrieval-Augmented Generation; system that searches for knowledge from incorporated materials and audio and has AI generate answers and summaries based on such information

04 Promotion of ZEB service utilizing building service system and building EMS

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Tokyo Electric Power Company Holdings

- Realization and widespread adoption of the national government's "Net Zero Energy Building (ZEB)*1" are promoted
- Capturing the trend of decarbonization as a business opportunity, one-stop ZEB service collaborating with group companies is developed
- Combining energy saving (CO_2 and utility cost reduction through energy management) and energy creation (solar power generation, etc.) contributes to environmental sustainability, enhances real estate value, and improves the comfort and productivity of building users

Key points and prospects of the initiative

Promotion of energy saving through data-driven optimization of building equipment system operations

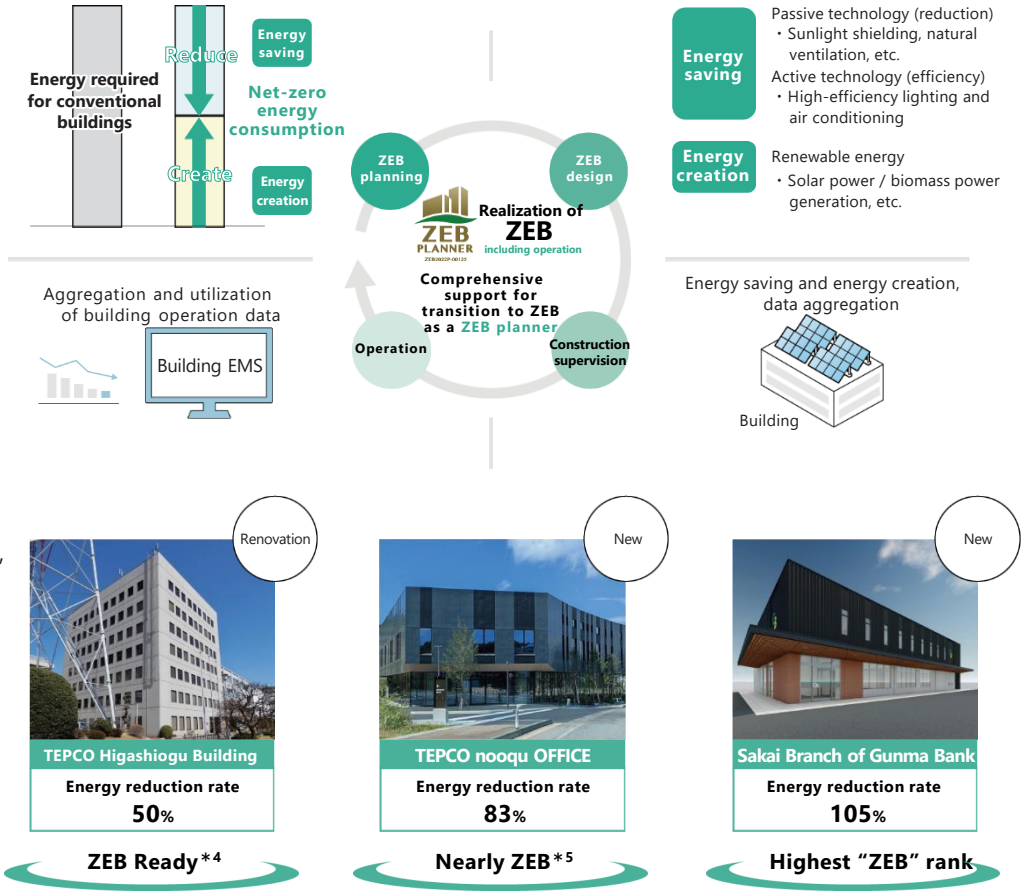
- ☐ Efficient and continuous energy reduction is pursued through the optimization of facility equipment operations through the measurement, collection, and analysis of diverse building data, combined with the use of machine learning.
- ☐ Optimum ZEB is realized based on data with passive technology for reducing energy consumption, active technology for highly efficient energy use and energy creation technology
- ☐ In the future, advanced utilization of building operation data (heat and electricity) using generative AI will contribute to regional power supply stability and further energy savings

ZEB services leveraging extensive building management experience

- ☐ Recognized as a ZEB Planner*2 for ZEB and energy-saving technology and experience. In addition, the highest ZEB rating*3 was acquired with the new building design for customer buildings
- ☐ One-stop services are provided from planning to operation as a group.
  Transition to ZEB for buildings is supported through long-term commitment to customers

Deployment of ZEB service

- ☐ The ZEB service is fully rolled out and commercialized to mainly promote the transition to ZEB for new and existing small-to-medium-scale buildings (with numerous implementation records at bank branches, offices, and other facilities)
- ☐ A data platform related to ZEB is built, and further expansion of market share and deployment to other domains are envisioned



*1: A building that aims to achieve a net-zero balance of annual primary energy consumption while maintaining a comfortable indoor environment
*2: A service provider that has a consultation service for the general public to achieve ZEB, provides work support (building design, equipment design, construction, energy-saving design, consulting, etc.), and discloses such activities
*3: A state in which the total primary energy consumption of the entire building is reduced by 100% or more, resulting in net-zero energy consumption
*4: A state in which the total primary energy consumption of the entire building is reduced by 50% or more through energy-saving measures
*5: A state in which the total primary energy consumption of the entire building is reduced by 75% or more but less than 100%

See here for detailed information and/or inquiries regarding ZEB cases (in Japanese only)

05 Advanced facility management of nuclear power stations utilizing 3D model technology

TEPCO
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- A BIM[*1] model is introduced as digital technology that enables three-dimensional representation of the shapes of buildings and structures, then federate with the facility inspection and maintenance management system
- Not only the exterior but also interior structures such as walls and penetrations are visualized by creating 3D models of nuclear power station buildings
- Further advancement of power station operations is pursued while ensuring the reliable maintenance of safety design through accurate planning and implementation of penetration maintenance

Key points of the initiative

3D modeling of building details

☐ Traditionally, when performing penetration repair work to ensure fire protection and watertightness, it used to take time to identify penetrations that are hidden behind large equipment

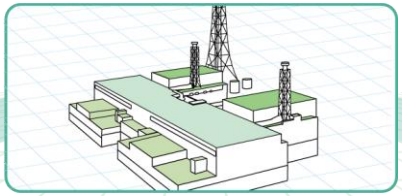
☐ To address this issue, various design requirements are digitized and centrally integrated and managed. In addition, large volumes of floor plan information and geometric data are viewed using a proprietary viewer on tablet devices, thereby improving operational efficiency

Easy information sharing among diverse partners

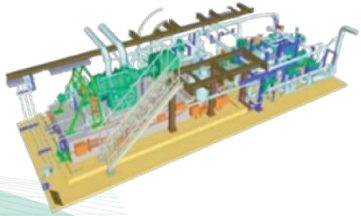
☐ Failure to factor in requirements is prevented in the design phase

☐ Miscommunication among organizations and companies is prevented
➡ Construction errors are consistently prevented from design to the field

Example of visualization of wall penetration



3D modeling of nuclear power stations



Example of 3D modeling of building

Simplifying design requirements and structural understanding

Advancement of maintenance plan

Prospects of the initiative

Further pursuit of safety

☐ Improve accuracy of design and construction by sharing models with external parties

☐ Reinforce integration between systems and streamline field operations

Further effective use of 3D models

✓ Advancement of data management

✓ Expansion of scope of collaboration and utilization of external software

✓ Tracking management of areas that need repair

＊1： Building Information Modeling; system that centrally manages building and equipment information with 3D models

06 Accelerated restoration and maximized renewable energy generation through real-time management

TEPCO Renewable Power

- Development of a system that ① collects, stores and connects, ② effectively utilizes and ③ monetizes data is promoted since 2020
- Environment to easily access internal data of power generation status and income and expenditure status is built to realize data-driven real-time management
- Social values, such as stable supply, increased power from renewable energy and contribution to disaster prevention, are created with faster decision-making in the field, advancement of management decision-making and optimization of the entire watershed by utilizing AI

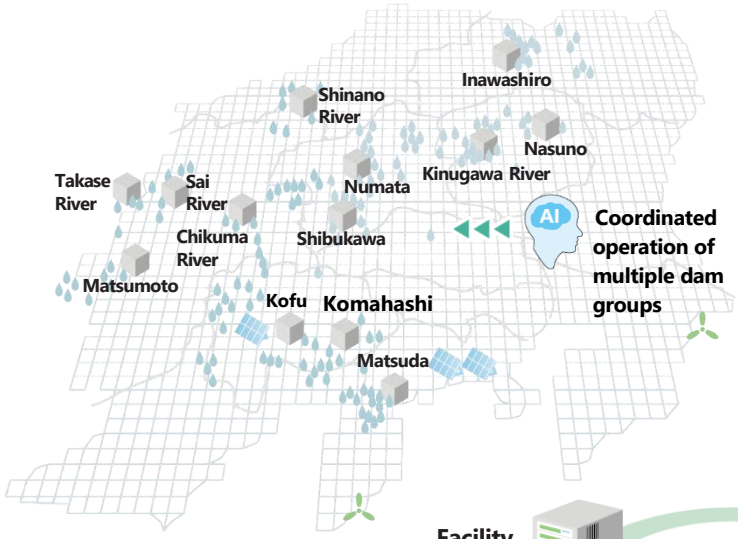
Key points of the initiative

Centralization of various data

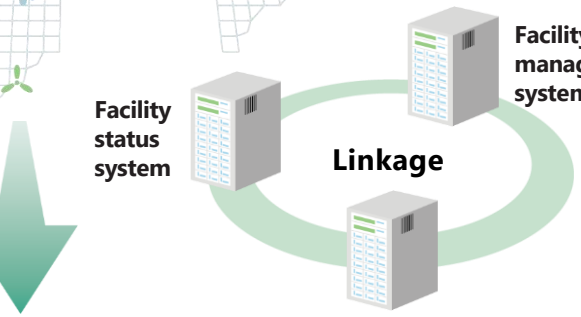
- ☐ By leveraging facility-related data enhanced through the deployment of sensing infrastructure, together with accumulated financial performance data and weather data surrounding power stations, the quality of operational analysis is significantly enhanced
- ☐ Advanced analysis is planned by linking weather data that cannot be collected by power station facilities alone
- ☐ Management indicators are visualized in real time with a unique dashboard
- ☐ Security issues are addressed with external collaboration

Both increased power and disaster prevention by utilizing AI

- ☐ AI leveraging accumulated operational data together with external weather data is used to simulate an optimized dam operation model for the entire watershed—including downstream power stations—based on the coordinated operation of multiple dam groups, with the aim of contributing to both increased power generation and disaster prevention.



*Concept drawing



Prospects of the initiative

- ☐ This enables accurate operational and management decision-making in real time and significantly accelerates responses such as trouble recovery
  ➡ Maximized renewable energy generation
- ☐ Time required for dam operation simulation*1 is shortened by 99% at maximum

*1: Time required for water balance simulation is shortened from "8 hours for a single dam" to "2-3 seconds for multiple dams"

07 Smart maintenance of hydro and wind power stations utilizing drones

TEPCO Renewable Power

- In response to growing interest in CN[*1] and increasing demand for renewable electricity with relatively low cost volatility, renewable energy (especially hydro and wind power) is being promoted as the main power source
- Although maintenance work has traditionally consumed a lot of manpower and time, the corresponding operating costs and work accident risks are an issue
- Advancement of maintenance work utilizing drones is planned to realize smart power stations that connect facilities, people and work operations with data and creates maximum values

Key points of the initiative

Unstaffed operation of a wide range of maintenance work

☐ Remote monitoring and remote control utilizing drones in various aboveground and underwater maintenance work contributes to not only improving productivity and reducing work loads but also preventing personal injuries by eliminating dispatch during emergencies

Strong internal and external promotion system

☐ Collaboration system with major domestic telecommunications infrastructure operator is developed. A system that enables autonomous drone flight within a 2km radius is established at hydroelectric dams that were previously radio insensitive.

Prospects of the initiative

☐ Shorten trouble investigation time[*1] by approx. 96% at maximum

☐ Completely eliminate major personal injury risks during emergency dam inspection work

Image of utilization of drones at a hydro power station

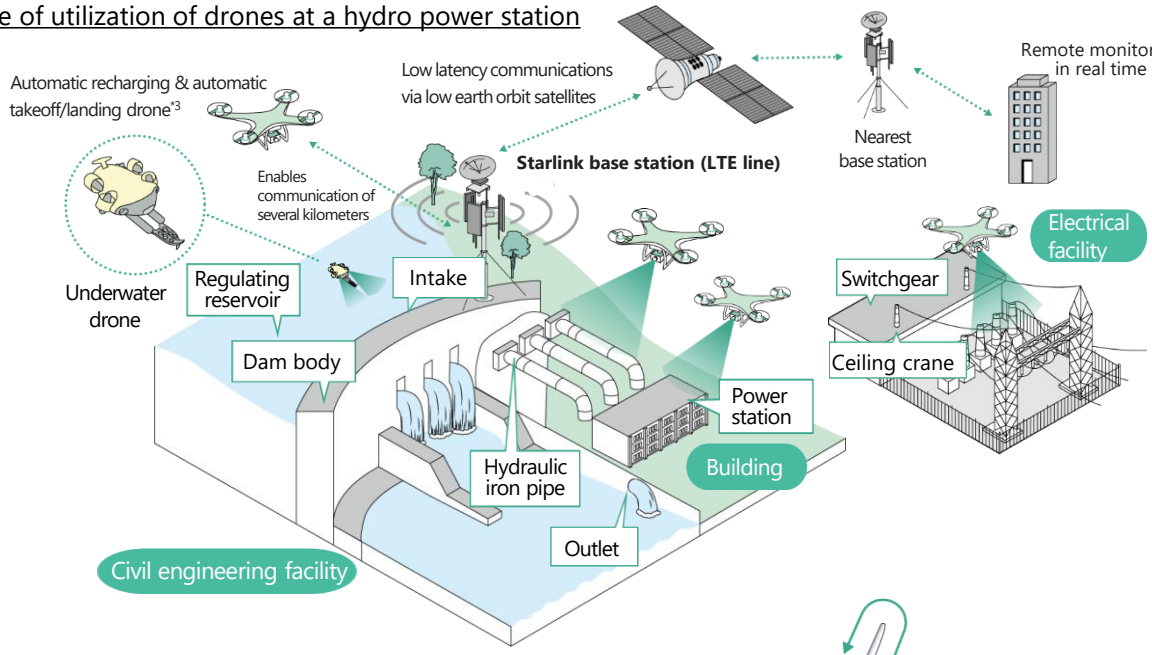
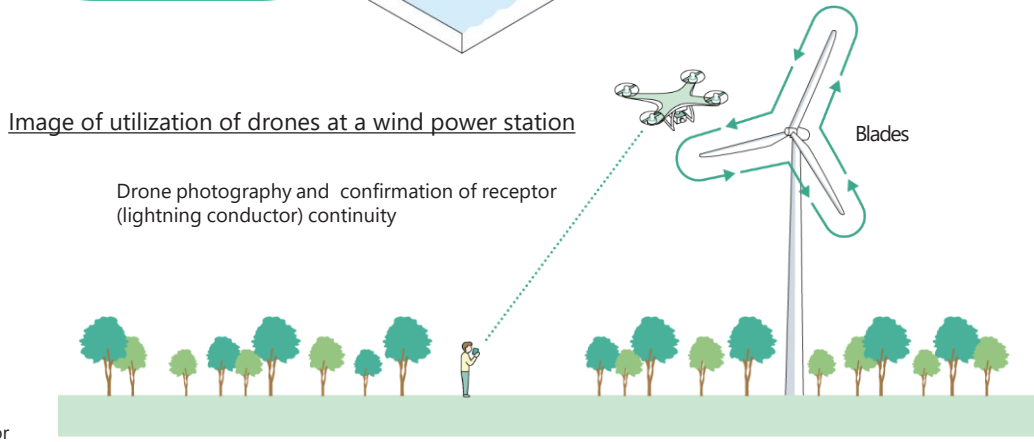


Image of utilization of drones at a wind power station



*1: Carbon Neutral: zero emission and absorption of CO_2

*2: Time from occurrence of the trouble to start of investigation is shortened from "more than 2 days including arrangement of personnel and materials" to "within 2 hours"

*3: Dam inspection by remote operation with autonomous flight drones utilizing satellite communications facilities for the first time in Japan

08 Advanced substations utilizing cutting-edge digital technology

TEPCO Power Grid

- The power system has become more complex due to the massive introduction of regenerative energy to realize a CN society.
- In order for power transmission and distribution operators to concurrently achieve stable supply of low-cost electricity, strengthened resilience, and decarbonization, more sophisticated substation operations are needed more than ever
- Reduction of patrol and inspection cost and suppression of facility renewal cost are planned by promoting digitization (sensing function, AI, 3D technology, drone, etc.) of substations and remotely grasping and assessing signs of abnormality and status of deterioration of facilities in real time

Key points of the initiative

Utilization of the largest scale of substation facility data in Japan

- ☐ Various data*1 that could not be collected previously is collected and accumulated by establishing communication and monitoring control NW complying with international communication standards, and by sensing function
- ☐ Relevant drawings are converted into data to link abnormal areas with facility data when facility abnormality occurs, and speedy recovery is aimed for

Wide range of advanced and unstaffed maintenance work

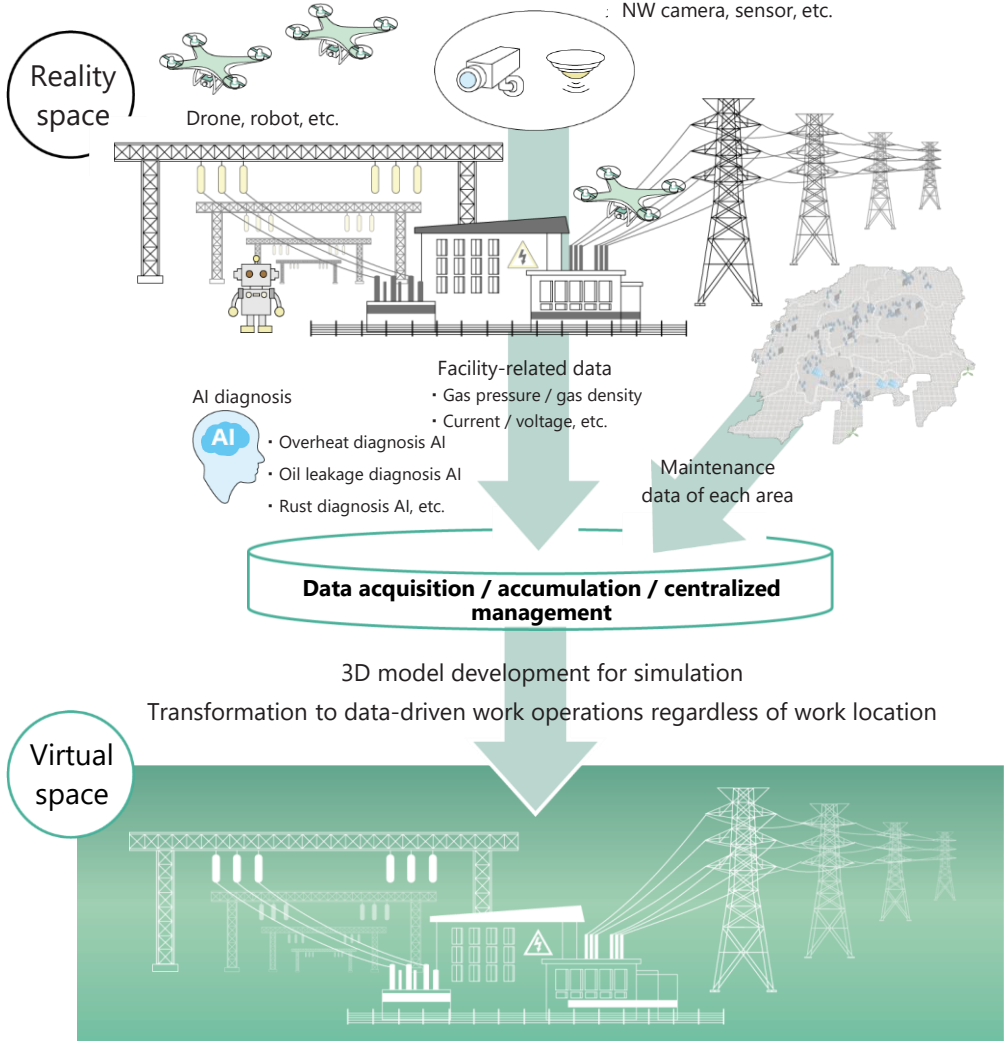
- ☐ 3D models are created based on above data, and advanced simulations are performed
- ☐ Image diagnosis AI is developed. Advancement of field patrol work and labor-saving due to eliminating dispatch are planned, by developing a network that can remotely grasp failure information, etc. and combining it with drones

Various alliances

- ☐ Image diagnosis AI system is developed by collaborating with major telecom companies and AI startups

Prospects of the initiative

- ☐ Fully digital substations are planned to be realized by linking various AI systems, BIM and drones, etc.
- ☐ There is prospect to further reduce and automatize work operations and create new values by analyzing a vast amount of facility data with AI and creating digital twins



＊1： Gas pressure / gas density, current/voltage, operation time, etc.

09 Advanced maintenance of power transmission and distribution utilizing automatic drone flight system

TEPCO Power Grid

- Visual checks by going to the site are the basis for facility patrols and inspection work, which requires much manpower and time
- Aging of power transmission and distribution facilities and decrease of inspection workers due to the declining birthrate and aging population are issues, and it is a concern that stable supply will become even more difficult
- Early recovery from disasters and efficient and labor-saving patrols and inspection work are promoted by grasping equipment status with automatic drones and detecting abnormalities with AI

Key points of the initiative

Advanced facility maintenance with AI ×drones

- ☐ Highly safe automatic drone flight system is built based on 3D data and know-how of facilities accumulated through facility maintenance work
  (A total of 10,000km of autonomous flight routes for drones used in power transmission facilities is planned to be established by FY2027)
- ☐ High-precision facility diagnosis is realized with AI utilizing a vast amount of facility image data accumulated since 2013
- ☐ Image analysis platform with multiple AI implementations that diagnose image data acquired with the automatic drone flight system is being developed

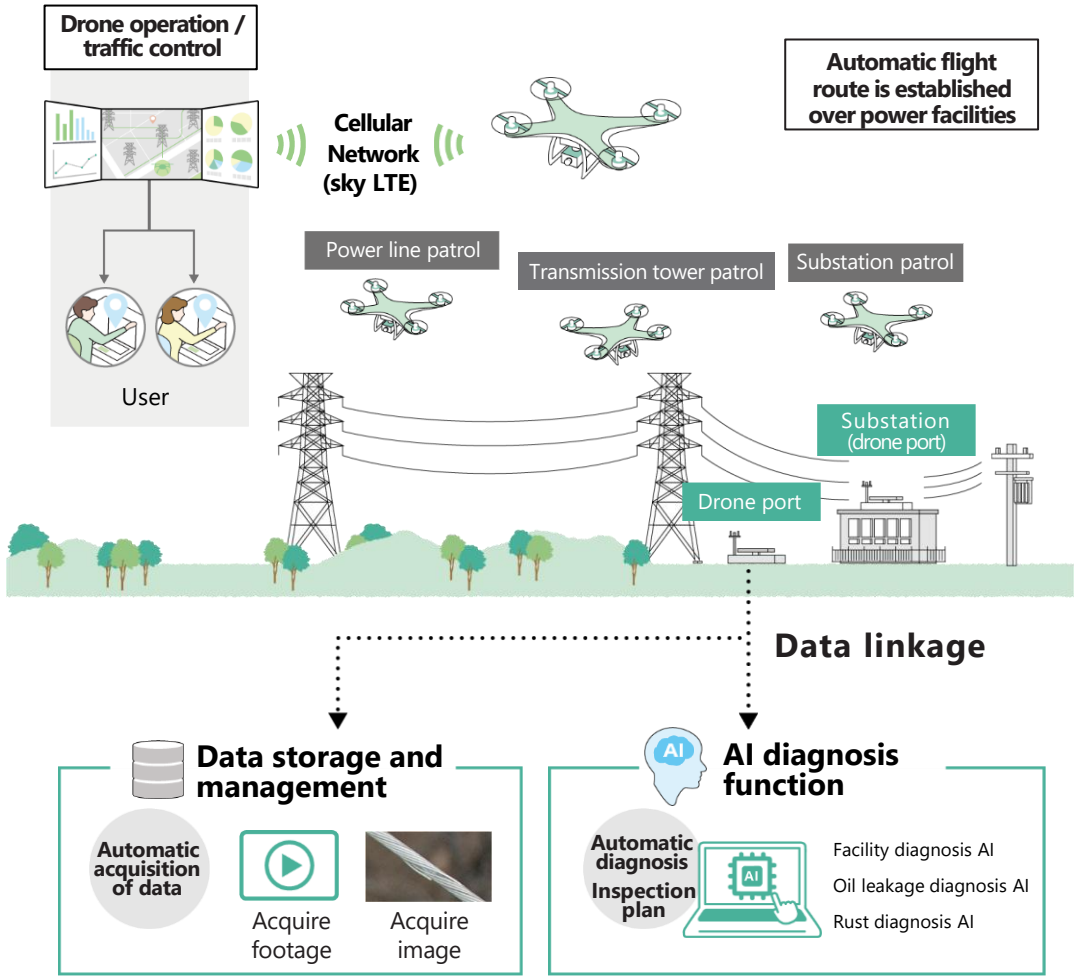
Various alliances

- ☐ Multiple AI and systems are linked and centralized by cooperating with major system integrators
- ☐ Initiatives are accelerated by expanding the framework of the business association established by electric utilities and 15 major system integrators

Prospects of the initiative

- ☐ Drastically reduced work time and inspection cost by automatizing inspection work and eliminating dispatch
- ☐ The automatic flight system is planned to expand its application to substations and power distribution areas and further strengthen resilience during disasters, after being applied to practical work in power transmission areas

Power facility inspection



10 CX/EX innovation and Advanced contact center driven by generative AI

TEPCO Energy Partner

- CX[*1] and EX[*2] are improved through a multi-channel environment such as chat, voice bot and FAQs
- The Voice of the Customer is appropriately captured through accumulation of conversation logs and utilization of generative AI to achieve both improvement of service quality and compliance with laws and guidelines, thereby establishing an operational framework rooted in security and trust

Key points and prospects of the initiative

Improvement of customer satisfaction

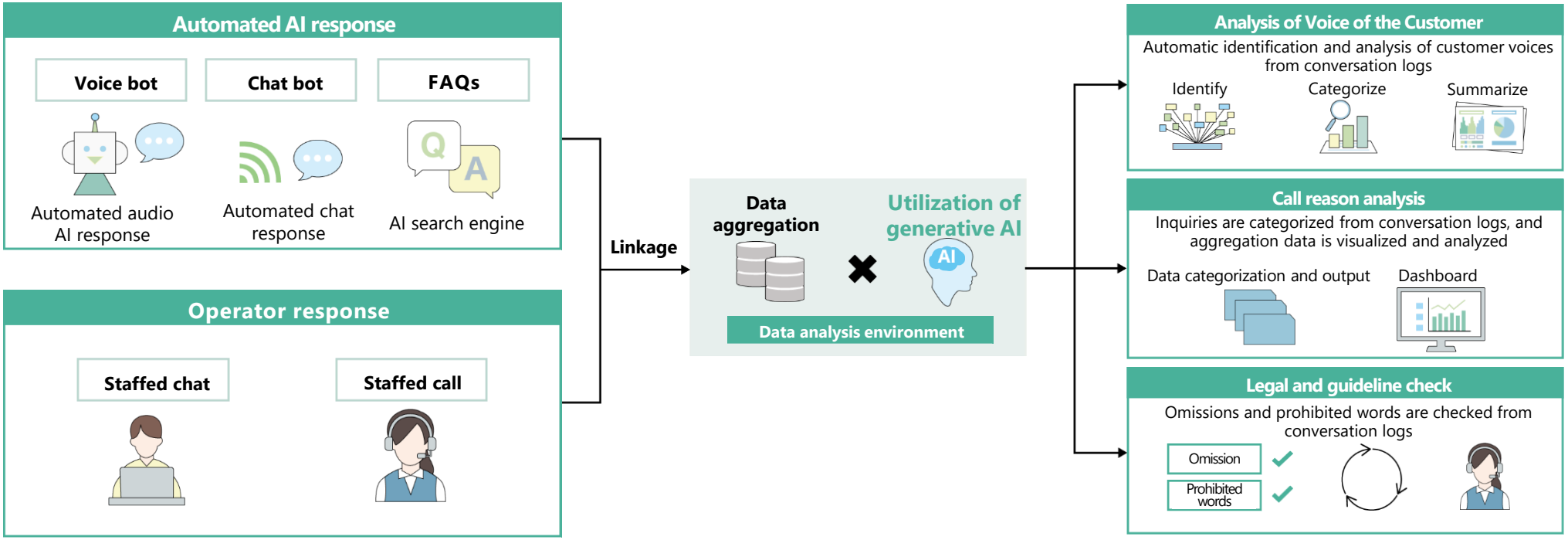
- ☐ Usage rate of multiple channels (channels other than phone)
  FY2024: 56.2% (+2.2pt YoY)
- ☐ Record of reception completion via AI chat
  FY2024: 774,000 cases (91% satisfaction)

Improvement of operator response quality

- ☐ Smooth response through text linkage with automated AI response and operators
- ☐ Work is streamlined and workload is reduced for operators, in addition to improving response quality, through call summary by generative AI

Future prospects of use of generative AI

- ☐ Analysis of Voice of the Customer: Visualization of customer needs and issues
- ☐ Call reason analysis: Utilized to improve service quality and properly assign operators
- ☐ Legal and guideline check: Comprehensive checks for omissions in communication during phone calls related to compliance with laws and guidelines



*1: Customer Experience; experience of customers in their involvement with companies
*2: Employee Experience; experience of employees as they work in the company

11 Development of healthcare service utilizing high-definition power data and AI technology

TEPCO Power Grid

- Energy Gateway, Inc. is established together with an AI startup to develop and expand IoT platform services
- Comprehensive healthcare services, including nursing, monitoring and medical care, are developed by accumulating, analyzing and utilizing high-definition electric power data leveraging TEPCO's unique sensing technology
- Innovations are being created by building an ecosystem with various organizations of industrial, government and academic collaboration

Key points and prospects of the initiative

Promotion of health by visualizing daily rhythm

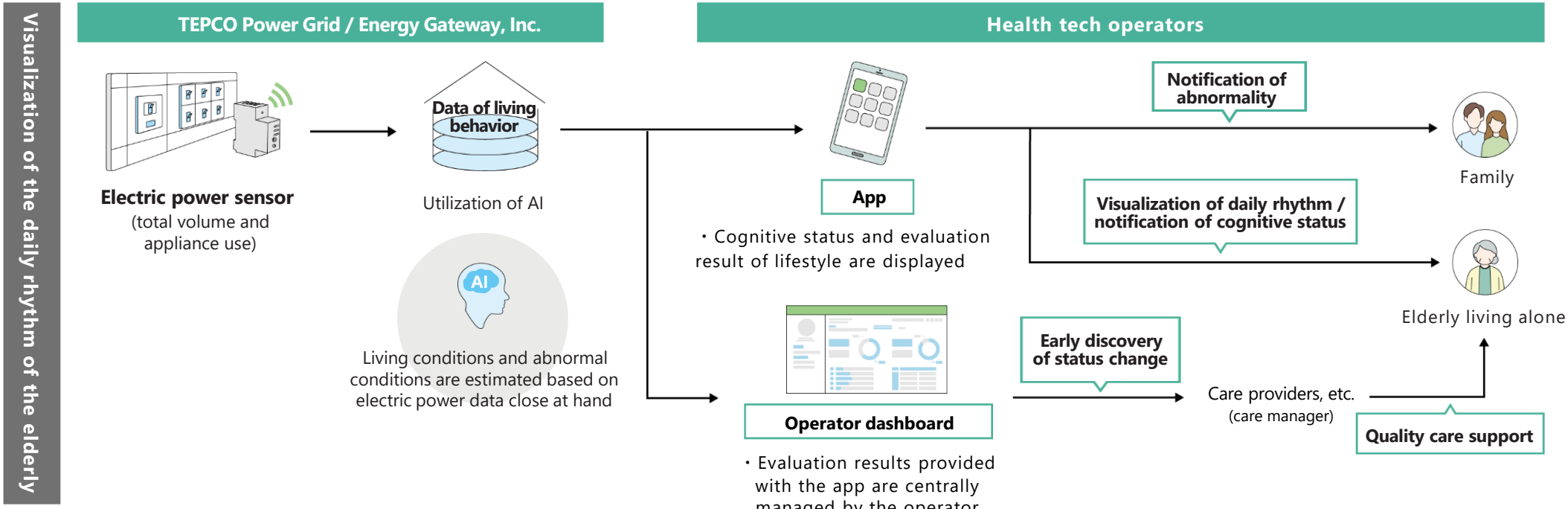
☐ High-precision electric power data is collected and analyzed to estimate the daily rhythm of the elderly by utilizing AI

☐ Services are provided based on the estimated daily rhythm to improve QOL of customers

Innovation through various co-creation opportunities

☐ The world's first prediction model*1 for cognitive decline using electric power data is jointly developed (detection rate exceeds 80%)

☐ Development of healthcare services is being promoted together with industry, government and academia by collaborating with medical organizations, local governments and external companies



*1 : Contributes to early discovery of mild cognitive impairment (MCI) which is the pre-stage of dementia

12 Development of CN promotion service through advanced use of energy data

TEPCO Tokyo Electric Power Company Holdings

TEPCO TEPCO Energy Partner

- Options for customers have become more complex when shifting from a large-scale centralized to a locally produced and consumed energy system, as international megatrends of GX*1 and review of domestic policies run parallel
- Development of DX services that contribute to the formulation and execution of plans to realize carbon neutrality is promoted in a cross-organizational project framework as a long-term partner to customers, utilizing the strengths as an energy professional and utility data source company

Key points and prospects of the initiative

Challenging social issues of energy system structure transformation

☐ Planning, introduction and monitoring of an optimum energy system for customers, such as renewable energy and storage battery, are supported through active utilization of data

New long-term ×accompanying decarbonization solutions

☐ Long-term customer-oriented services that only the TEPCO Group can offer are provided

☐ Highly reliable decarbonation plans and measures backed by various internal and external big data are proposed

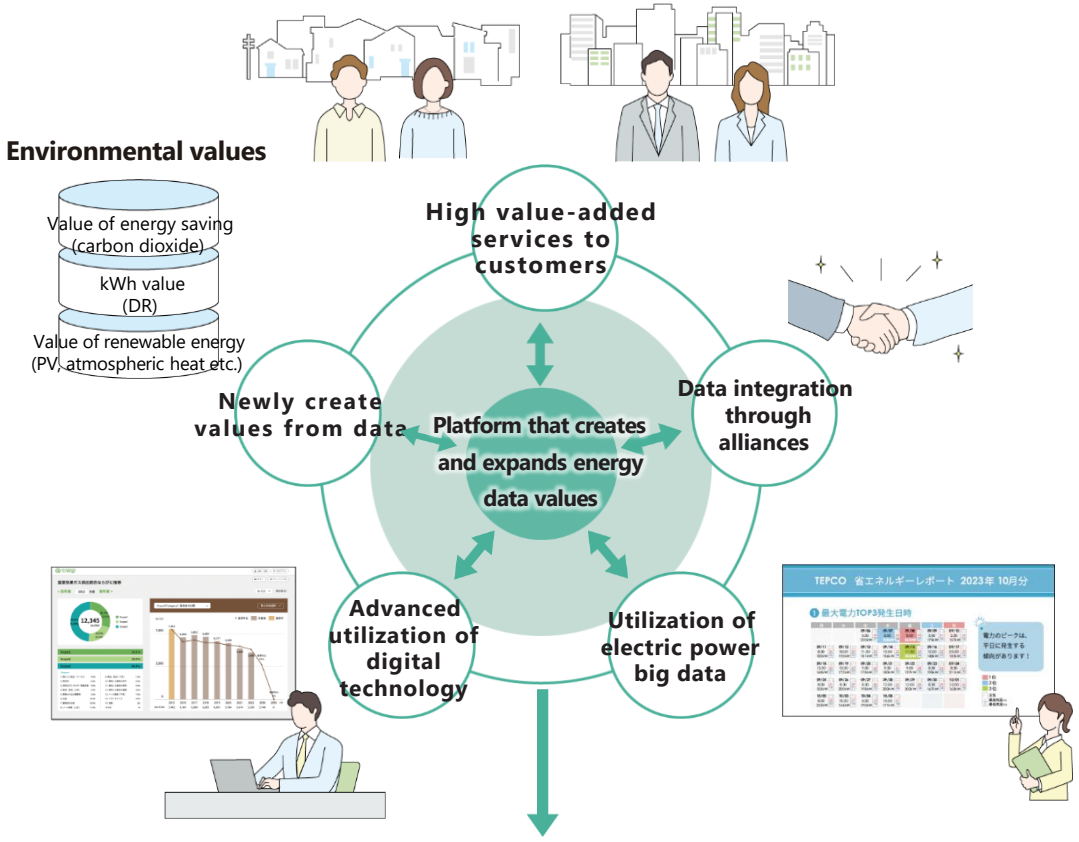
☐ CN consulting capabilities are strengthened with accumulated data to ensure more efficient customer CN

Various alliances

☐ Alliances through partnerships with financial institutions are expanded to broaden customer contact points and improve provided values

☐ There is prospect to refine energy data integration and analysis technology and further improve added values to realize CN

Highly effective and efficient decarbonization plan and management



Contribution to transformation of energy system structure for locally produced and consumed renewable energy

*1： Green Transformation; transforming industries and society into sustainable forms centered on decarbonization

13 Building a community based on CN and disaster prevention utilizing Area EMS

TEPCO
Tokyo Electric Power Company Holdings

- Both "decarbonization of power sources" and "electrification of demand" are needed to realize a carbon neutral society
- Area EMS (Area energy management system) that maximizes the use of regional renewable energy is implemented to flexibly operate renewable energy power sources and storage batteries according to regional characteristics and promote carbon neutrality of the entire region and strengthen disaster prevention performance
- By continuing to collaborate with local governments, educational institutions and companies, decarbonization-leading regional development projects and new businesses are promoted and new values are created

Key points and prospects of the initiative

Development of EMS according to area characteristics

- ☐ Area EMS according to the characteristics of each area is developed to realize local production and consumption through self-wheeling by municipal facilities, by utilizing various renewable energy generation and power transmission and distribution facilities as well as accumulated data and know-how (sales activities for horizontal deployment to other municipalities are being implemented)
- ☐ Actual supply-demand information is collected in real time and overall supply-demand status at each location is visualized, thereby realizing maximized local production and consumption through remote storage battery control
- ☐ Prediction precision is planned to be improved by analyzing accumulated power generation and demand/supply data utilizing AI
- ☐ A self-wheeling scheme using the data of the Power Data Management Association*1 is being considered

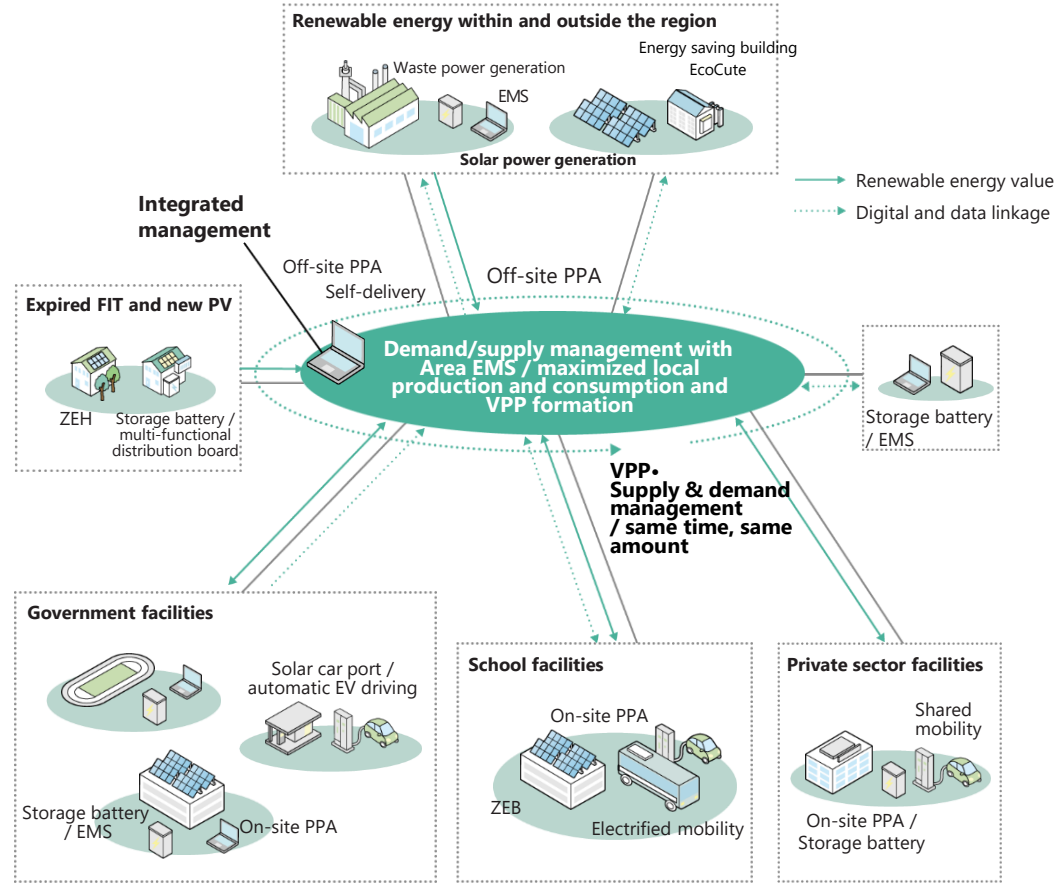
Building local communities through "industry-government-academia collaboration"

- ☐ Local production and consumption of energy is promoted through area-based energy solutions within specific areas and energy sharing among different locations
- ☐ Carbon neutralization of the entire region and disaster prevention performance is enhanced

Further creating values through the aggregation business

- ☐ VPP*2 (virtual power plant) that is integrally controlled using IoT technology is developed, utilizing storage batteries as balancing resources, while deploying small-scale, distributed renewable energy power sources in specific regions
- ☐ There is prospect to further create values by developing a next-generation power distribution scheme with a new aggregation platform
- ☐ Moving forward, implementation and deployment for companies are also planned to be further explored

Formation of VPP (future image)



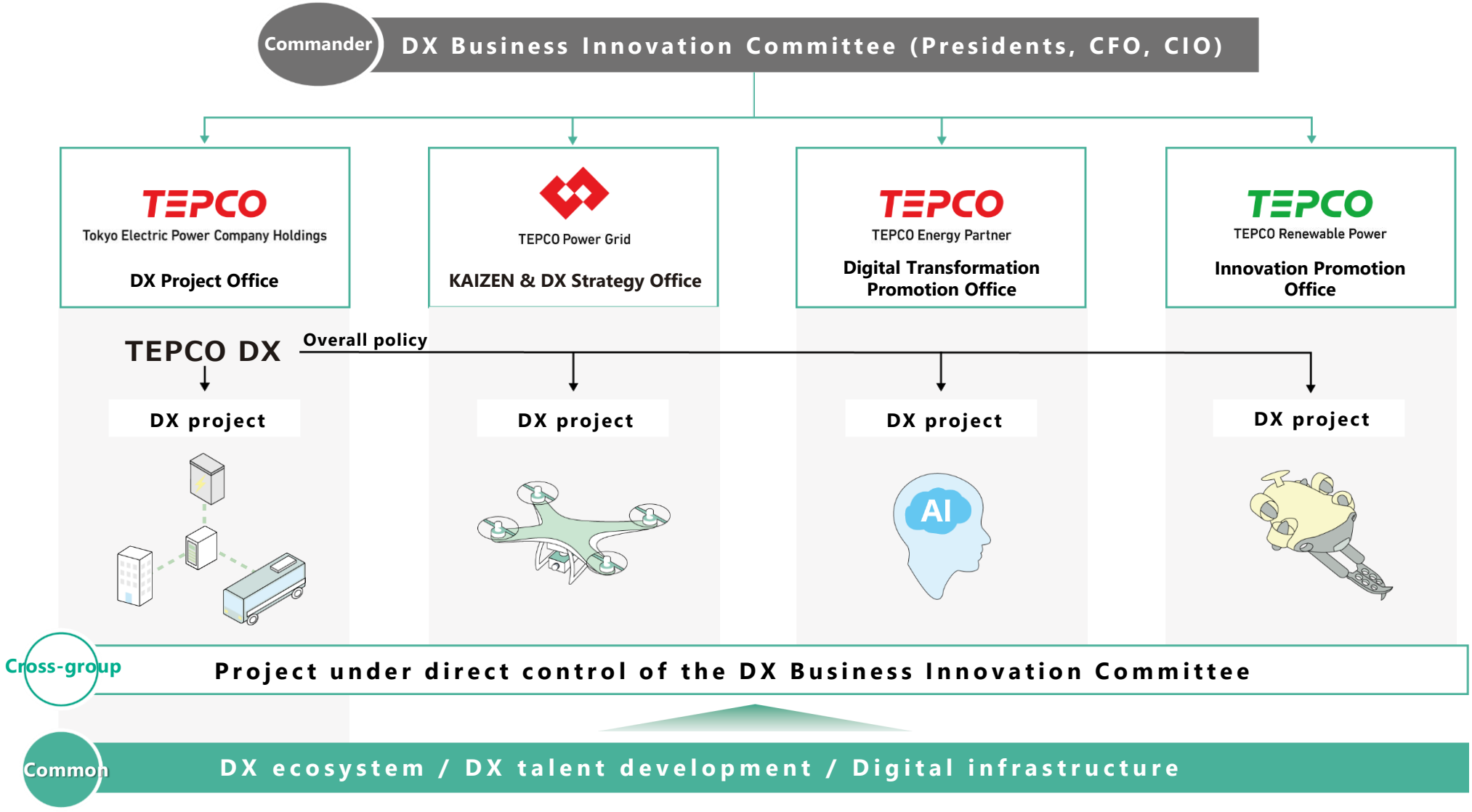
*1: A general incorporated association certified by the national government to safely and appropriately use and provide nationwide power data. The secretariat is GDBL Corp. which is funded by TEPCO Power Grid and others.

*2: Virtual Power Plant; functions as if it were a single power generation facility by integrally controlling distributed power sources using information and communication technologies, etc.. Participation in the VPP Construction Demonstration Project of the Ministry of Economy, Trade and Industry since 2016.

Foundation for DX Promotion

01 Framework of DX promotion organization

- Cross-group DX Business Innovation Committee, consisting of Presidents, CFO*1 and CIO, has been established with collaboration also with the Board of Directors
- Overall policy of the TEPCO Group "TEPCO DX" is developed and the DX project is promoted under the DX Business Innovation Committee
- Directly controlled cross-group projects are formed, and DX ecosystem, DX talent development and digital infrastructure are prepared



*1 : CFO (Chief Financial Officer)

02 Ecosystem of DX promotion

- DX ecosystem aiming for human resources development and project promotion is developed to promote TEPCO DX
- Extensive collaboration with the planning division, human resources division, IT/system division and other business divisions

DX Business Innovation Committee (Presidents, CFO, CIO)

Business company | Nuclear power / decommissioning | Corporate | Directly controlled project

Human resources / ideas

Transformation activity environment

- DX talent development program
- Know-how CoE
- DX internal awareness
- Internal community

DX talent

DX project

Digital resources

- Data infrastructure
- Analysis/AI tools
- Internal system
- System rules

System division

TEPCO SYSTEMS Corporation

Achievements (work transformation / new business creation)

Stable supply | Carbon neutrality | CX・UX | EX (TWI*1)

Unlock!

Producing transformation-ready talent, patterns of employee behavior, way of working

*1：TWI = TEPCO Work Innovation (initiative to create a comfortable working environment and promote workstyle reform)

03 -1 DX talent development policy

- Policy of development of DX talent based on the trend of latest technologies such as generative AI is developed along with the management philosophy and business strategies
- Image of DX talent is defined for 6 positions in 4 levels based on the digital skill standard*1, based on knowledge, skills and experience required for the promotion of TEPCO DX
- Approx. 8,000 people, which accounts for 30% of all employees, have been developed up to FY2025 as core personnel for DX promotion

DX talent development policy

Human resources portfolio

Skill level is defined for 6 positions in 4 levels based on the digital skill standard

6 positions of TEPCO DX talent

- Project manager
- Business architect
- Data scientist
- IT/system development
- Cyber security
- UI/UX designer

Certified levels and expected roles

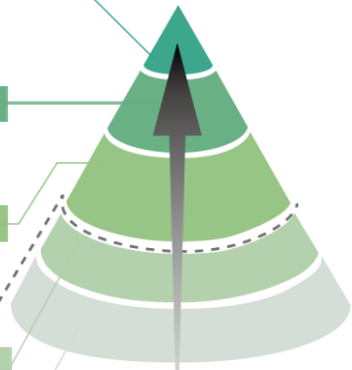
Lv.4 Advanced expertise / guidance
Lead company-wide DX with high expertise and play a leading role

Lv.3 Promotion
Play a central role in the promotion of each project of DX

Lv.2 Practice
Execute the role required for each organization with support from Lv.3 personnel

Lv.1 Understanding
Understand the methods and technologies of DX

Lv.0 Basics
Know the importance of DX

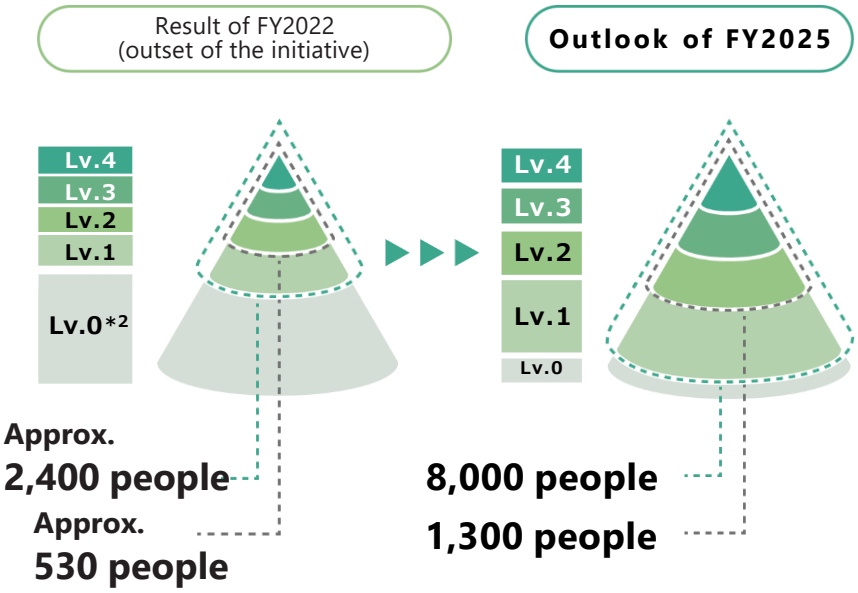


All employees aim for Lv.1 and higher

Development goal and result

All employees to DX talent

Approx. 30% (8,000 people) of all employees have transformed into core personnel for DX promotion



*1 : Guideline for capabilities, skills and mindset to be acquired by all business professionals involved in DX, formulated by the Ministry of Economy, Trade and Industry and the Information-technology Promotion Agency, Japan (IPA)

*2 : Digital literacy education has been implemented for all Group employees

IPA case studies on the use of digital skill standard (in Japanese only)

Corporate feedback on the IPA Information Technology Passport Examination (in Japanese only)

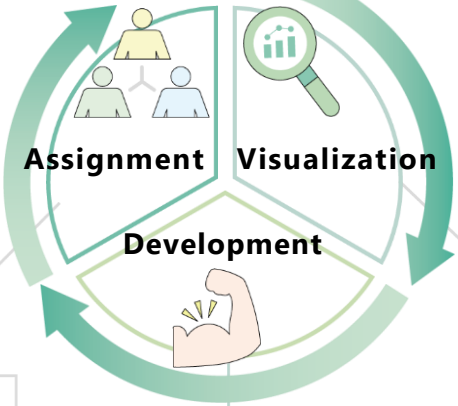
03-2 Reskilling cycle of DX talent

- DX talent development cycle of company-wide awareness, visualization, development, assignment and value demonstration is implemented to improve motivation and capabilities of each employee and maximize performance of the entire organization
- DX talent leads business structure transformation by promoting assignment and value demonstration in priority projects*1 through development of internal DX talent and recruitment of external personnel

Measures and coordination for fostering culture

Company-wide awareness

- Raise awareness of DX among all employees including corporate executives and management (DX study session for corporate executives, etc.)
- Encourage acquisition of DX-related qualifications certified for each position (development and operation of a self-learning community, etc.)

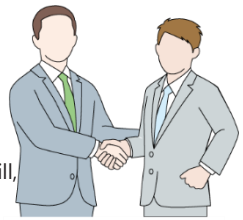


Value demonstration

Active in DX projects at one's assigned position

- Develop role models and career path for each position
- Support career challenge based on the career path of each person

- Expand the mechanism that stimulates and evaluates motivation for autonomous career development (various skill certification systems, etc.)
- Expand the "candidacy-system" personnel recruitment system
- Assign appropriate personnel to the appropriate place at the appropriate timing of internal and external practical opportunities based on human resources data such as skill, level and qualifications



- Build a system for level certification for each position
- Visualize the quality and quantity of DX talent required to realize the DX vision
- Evaluate personnel including qualitative elements (challenging mindset, etc.) through internal and external assessments
- Award an emblem to highly skilled DX talent

Rate of assignment of highly-skilled personnel to priority projects

100% in FY2025

TEPCO DX Learning Platform

- **Self-directed learning environment without being restricted by time and place (TEPCO CAREERSHIP*2)**
- **Optimized development contents according to position, level, skills, etc. based on learning data of each person**
- **Creating a place for challenge and friendly competition, such as competitions and study sessions**

Recruitment of external DX talent

Expansion of recruitment through flexible evaluation and treatment based on the trend of latest digital technologies

Hired number of highly specialized personnel

193 People in FY 2024

*1 : Major DX projects

*2 : Learning management system that centrally manages training and learning contents participation, progress tracking, participation history, and skills

04 -1 Fostering of corporate culture

- Various measures to foster company-wide DX culture are deployed such as providing contents that create opportunities for each employee to think about and act on DX as their own matter, creating an environment for transformation through the promotion of interaction through DX communities and contact points and building co-creation spaces for introduction of citizen development tools and generative AI
- Management calls out to mangers to foster a company-wide culture that encourages challenges regardless of position

People

Creating opportunities to make it one's own matter

- Delivery of company-wide messages by management
- Introduction of internal and external good practices and new projects
- Distribution of video of role model employees for DX practice
- Provision of training programs that respond to challenges (sessions on generative AI, tool utilization practice workshops, etc.)

Fostering of DX mindset

Process

Spontaneous and active interaction

- Bi-directional communication with management (dialogue meetings)
- Call for DX ideas developed in the field (consulting service, business plan contest by level from young employees to organization leaders)
- Development of DX communities, promotion of interaction
- Cross-departmental support for PoC/PJ for business and work transformation
- Reverse mentoring from young employees to management*1

Promotion of embodiment and implementation of ideas

Place

Creating an environment for transformation

- Incubation center that promotes internal and external co-creations and new business creation
- Agile development garage that searches for possibilities of technologies
- Company-wide deployment of citizen development tools and generative AI
- Centralized visualization of ideas, PoC, IT tools, etc. throughout the company

Transformation through open and agile co-creation

Unique environment that supports and encourages all-employee participatory transformation activities

▼

"All employees to DX talent" is promoted with each employee playing a leading role

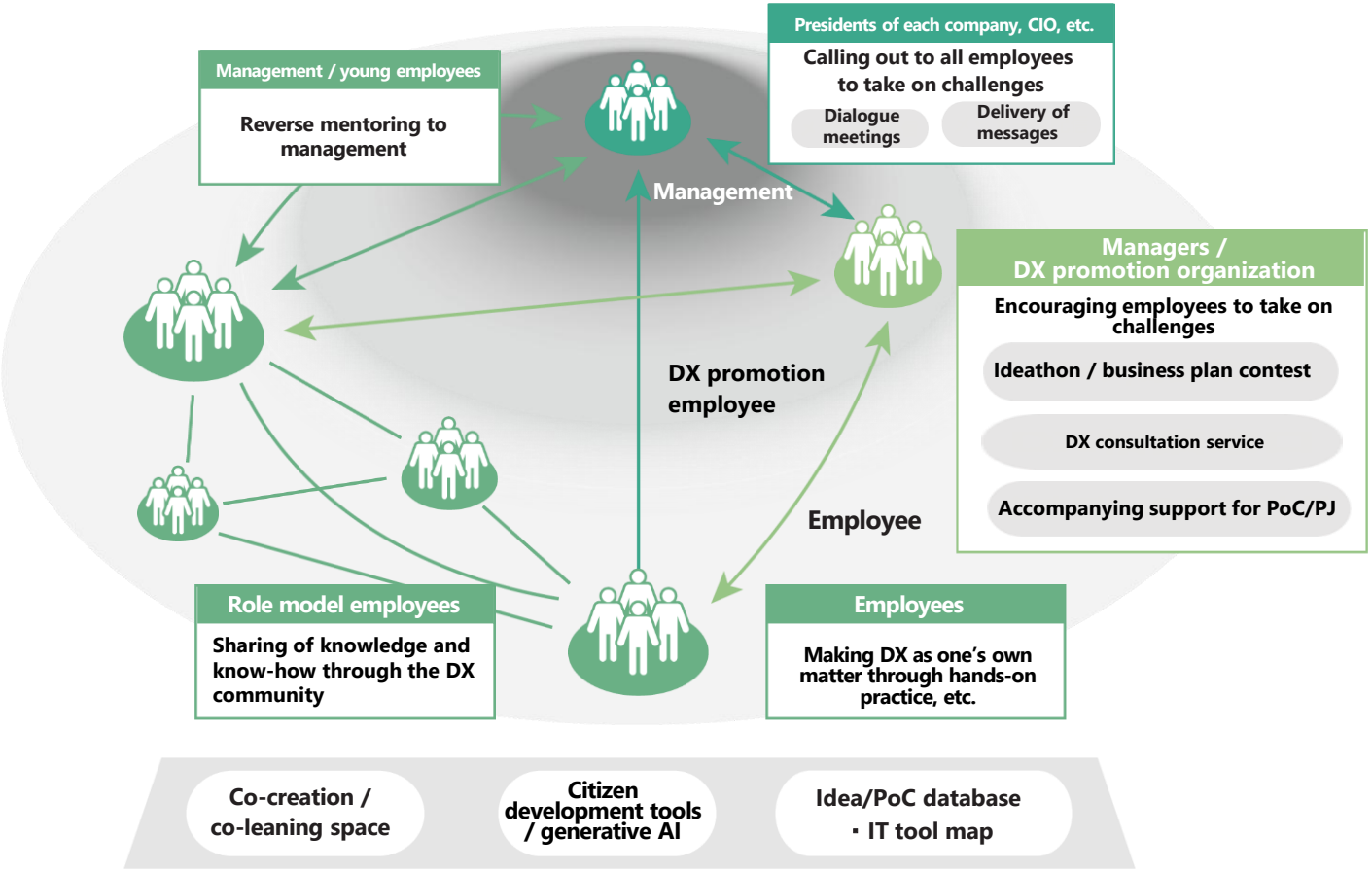
*1 : Mechanism that enables mutual learning with young employees sharing digital technologies and new values with management

04 -2 All employees to DX talent

- "All employees to DX talent" is developed as the aim of corporate culture
- All employees are categorized by hierarchical level and degree of change*1 to define the direction of roles and challenges required for each segment
- A mechanism for circulating "challenges" across hierarchical levels and a mechanism for stimulation and mutual enhancement within the community are developed

"All employees to DX talent"

Each employee is aware of their own role and responsibility,
and acts to realize the DX vision with initiative and responsibility



Reverse mentoring for management on M365 and generative AI
September 2025

100% implementation rate of reverse mentoring for HD executives

Approx. 70%*2 satisfaction rate in the survey on generative AI usage

Approx. 6,000 people who listened to top message

Approx. 70% feel work transformation

Approx. 1,500 organizations use the citizen development apps

*1 : Recognition → understanding → empathy→ practice (practice phase is coordinated with DX talent measures)

*2 : Result of the survey conducted across the entire Group excluding TEPCO Power Grid

05 -1 Building and utilization of digital infrastructure

- Infrastructure development is promoted for new value creation and business structure transformation through “data integration and utilization”, “system modernization” and “data democratization”
- Business models are transformed and earning power is improved by providing materials that contribute to corporate decisions upon clarifying the location of data and linking data
- Technical compatibility, work compatibility and maintenance cost are visualized for operating systems to develop Kaizen plans and streamline corporate resources
- Data resources of the entire Group are strategically utilized to create new businesses that contribute to solving social issues, thereby promoting co-creation activities flexibly

Data integration and utilization

- Data strategy organizations and business divisions collaborate as one team to accelerate improvement of corporate values through data management
- Metadata catalog (book catalog of internal data) is developed to improve data exploration
  Development rate: 90%*1 (2025)
- Use of data is promoted in the Group by increasing systems that connect with “data virtualization infrastructure” which enables easy and fast reference and collection of data

System modernization

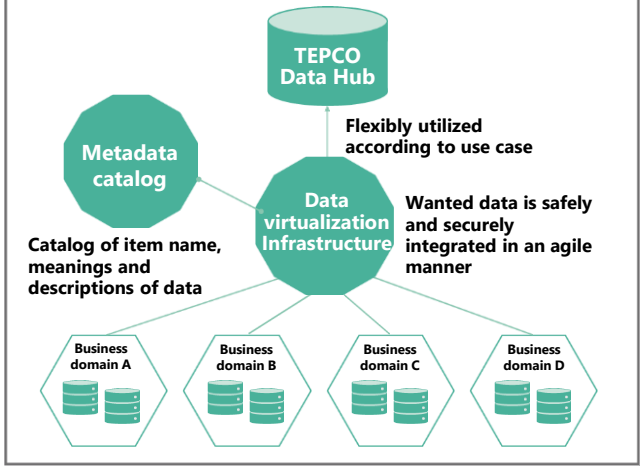
- “Kaizen” plan is developed, including actions such as renewal, discontinuance and reduction of functions, to prevent re-legacy
- Operating systems are evaluated from the perspectives*2 of technology, work compatibility and cost
- Legacy system is efficiently renewed based on evaluation results

Data democratization

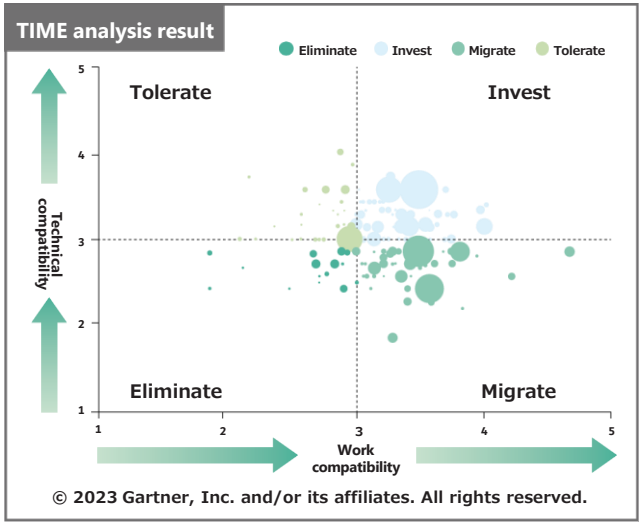
- Actions for aggressive promotion of new business areas is accelerated with the “business agile center”
- “TEPCO Data Hub”, a digital service platform that can link various internal and external data across the Group, is developed upon ensuring information security. External sale of data is also considered
- Development of data analysis talent is also emphasized in parallel with the development of an environment that can safely, promptly and easily be handled by anyone

➡ Agile support for further improvement of work productivity and creation of new co-created values

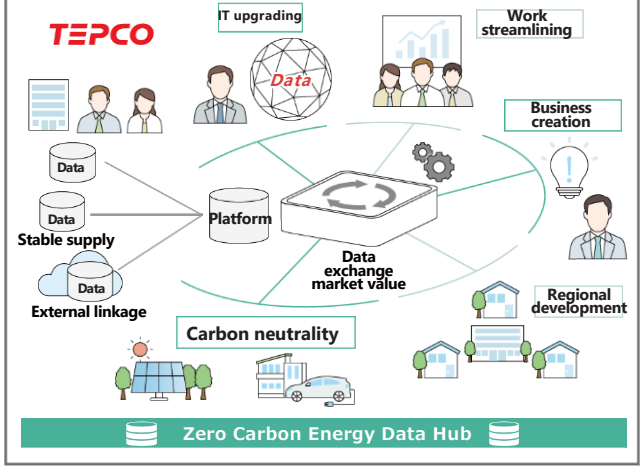
Development of data infrastructure that utilizes metadata



TIME analysis result



TEPCO Data Hub product vision



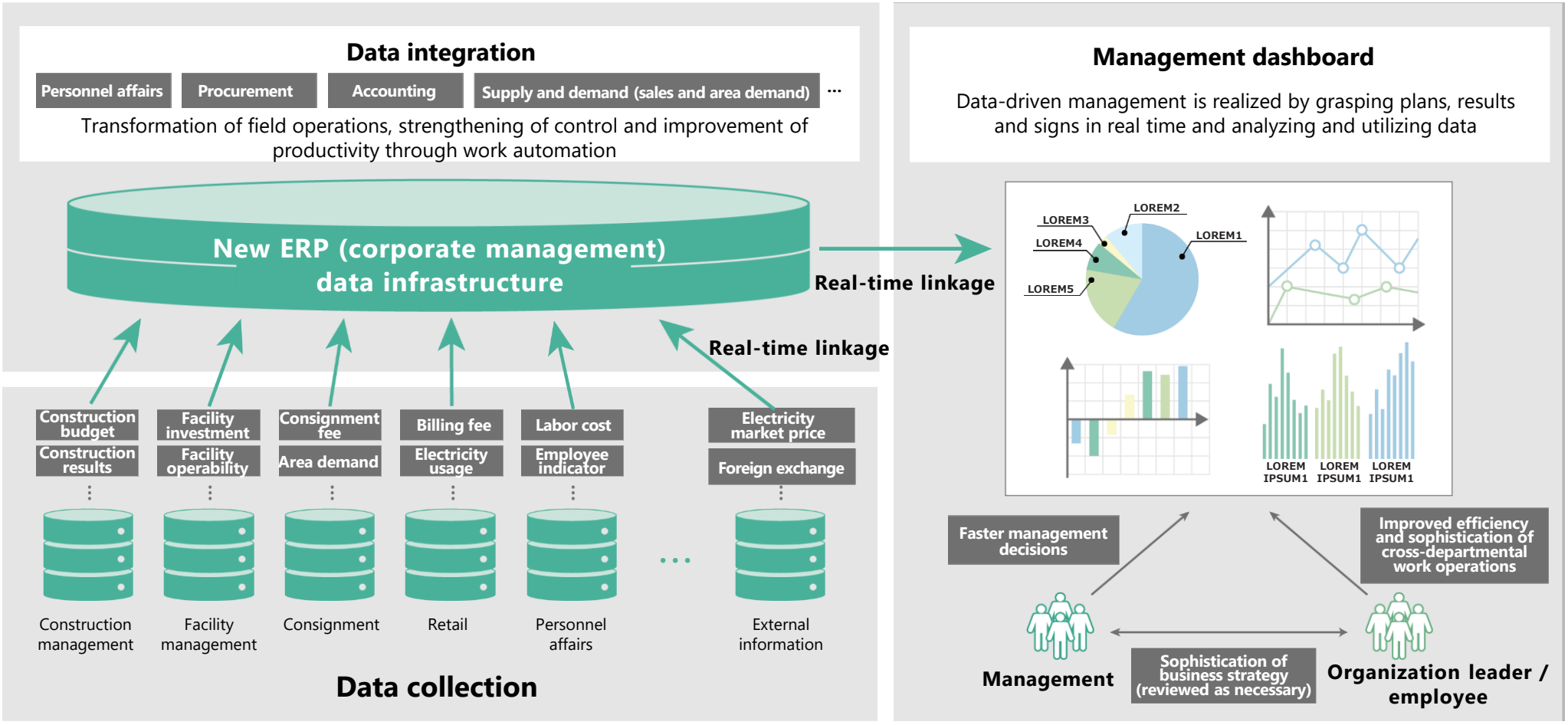
*1 : Rate of data development is 90% at maximum

*2 : Evaluation of optimization of system arrangement and investment justification through TIME (Tolerate Invest Migrate Eliminate by Gartner) analysis

05-2 “Data-driven management” with next-generation management infrastructure

- Next-generation management infrastructure is developed to realize data-driven management which can make data-driven decisions in all aspects of business, as an initiative to develop and use digital infrastructure
- Signs are grasped from the analysis of major indicators of each business, and instructions are given to restructure the business if necessary. Business portfolio is optimized by deciding to strengthen or discontinue a business based on the analysis of its growth and profitability
- Status of measures is grasped and promoted to achieve the ESG*1 strategy, and information disclosure is expanded

Next-generation management infrastructure



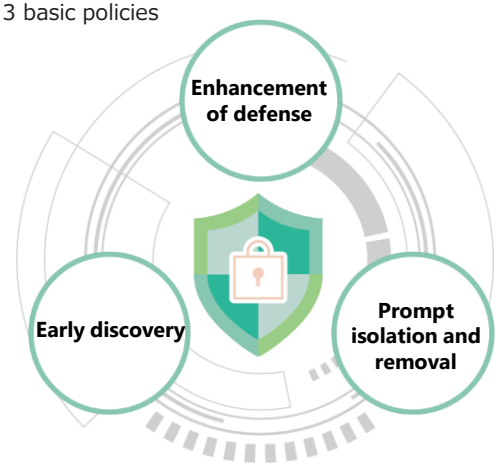
*1 : Environment, Social, Governance (three key perspectives in corporate management)

06 Cyber security

- TEPCO positions cyber security as a priority management issue, and security is being reinforced centered on CISO and a dedicated security organization under the cyber security policy
- Organizational and individual capabilities are visualized and sustainably improved based on CSF*2 and NICE*3 of NIST*1 which is an international framework
- Security rules following constantly advancing technologies such as cloud and generative AI are developed to ensure security and promote DX and ICT

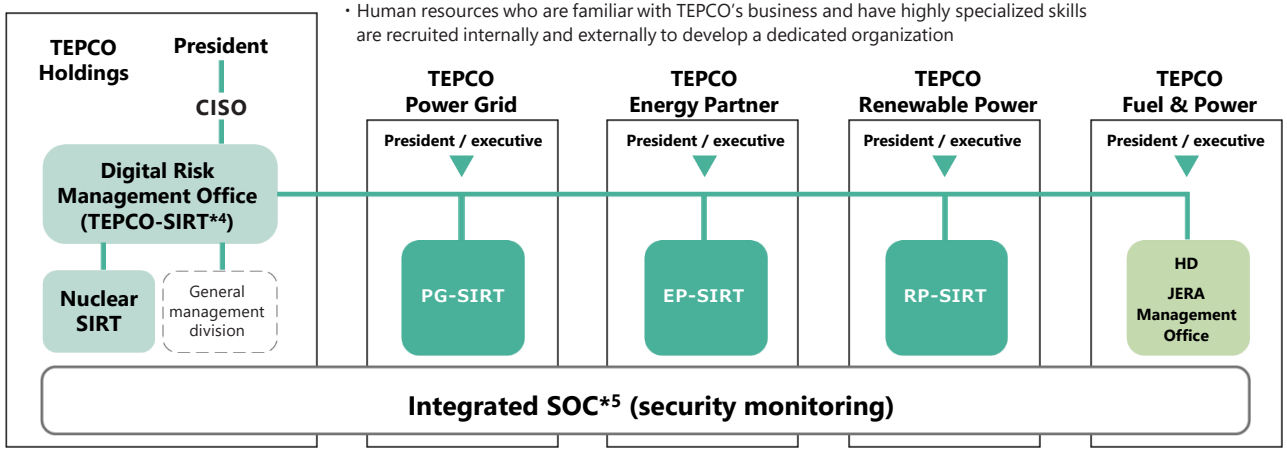
Cyber security policy

- Measures are implemented under the 3 basic policies



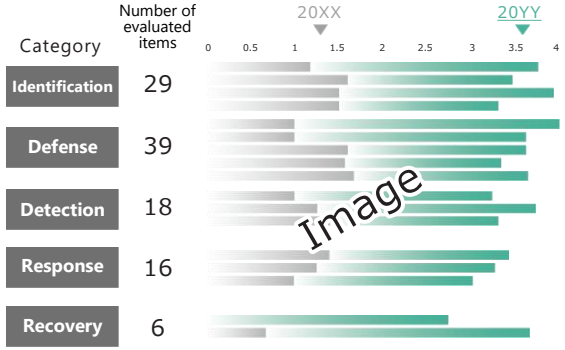
Governance framework

- Progress of security measures and response to external threats are regularly reported to the board of directors
- Framework that monitors IT and OT (control and operational systems) security 24/7 is developed by establishing dedicated organizations (approx. 140 people in total) at HD and each core business company centered on the Chief Information Security Officer (CISO)
- Human resources who are familiar with TEPCO's business and have highly specialized skills are recruited internally and externally to develop a dedicated organization



Risk assessment

- Organizational capabilities are evaluated every year based on CSF of NIST which is an international framework
- Risk assessment is performed at subsidiaries and some affiliated companies to develop and execute risk reduction measures
- Contact point to receive notifications and consultations from employees is established to grasp risks from the perspective of system users



Education and training

- Individual capabilities are evaluated every year based on NICE of NIST
- Acquisition and training of specialized security qualifications are supported to develop a large number of international qualification holders such as CISSP*6 (approx. 20 CISSP holders, approx. 10 holders of CISA*7 and CISM*8 each)
- Security literacy of all employees is improved through proactive internal communications, e-learning and targeted e-mail training, and regular case studies on cyber incidents at all organizations
- Annual drills with management and the dedicated organization working together are conducted to continue TEPCO's business during emergencies

＊1 : National Institute of Standards and Technology ＊2 : Cyber Security Framework ＊3 : National Initiative for Cybersecurity Education ＊4 : Security Incident Response Team
＊5 : Security Operations Center ＊6 : Certified Information Systems Security Professional ＊7 : Certified Information Systems Auditor ＊8 : Certified Information Security Manager

07 Utilization of generative AI

- Generative AI is positioned as the source of growth and competitive advantage, as it is seen as innovative technology that has the potential to lead to tectonic changes in social life and industrial structure
- Generative AI is introduced to TEPCO's dedicated environment for safe and secure use and deployed to all employees, with the purpose to shift resources to highly creative areas due to increased productivity under the basic policy to "recognize correctly, address risks and use wisely"
- Individual work operations are being enhanced and streamlined with general-purpose AI, and Microsoft Copilot and common RAG infrastructure (generative AI service to utilize internal data) are deployed. Moving forward, infrastructure will be built for "generative AI shift".

General-purpose use case

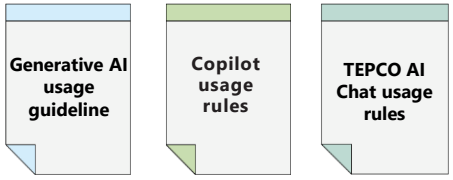
- Bouncing ideas
- Investigation
- Document creation
- Translation / interpretation / summarization
- Proofreading / correction
- Programming
- ⋮

Example of internally deployed AI assistant service (started use from July 2024)

Risks and measures

- Ethical issues
- Intellectual property issues
- Privacy issues
- Hallucination
- Bias
- Shallow fake
- ⋮

- Development of regulations on the use of generative AI (revised according to technological progress)
- Education is planned for the appropriate use of generative AI



Initiatives to promote development and utilization

- Distribution of training videos and articles
- Installation of bulletin board (generative AI navigation)
- Generative AI hands-on seminar
- Implementation of prompt assistance function
- Prompt consultation service
- Generative AI ideathon
- Support for individual projects

- Approx. 9,600 monthly users
- Approx. 4,000 seminar participants
- Approx. 390,000 prompt posts
- 170 collected ideas
- 27 created projects

Examples of application to practical work

Work area	Use case
Sales	Support for creating service proposal drafts
Engineer	Presentation of assumed factors of facility troubles
	Search of procedural manuals
Labor management	Review and presentation of industrial accident prevention measures
⋮	⋮

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