

Overview of Technological Needs for Daigas Group (Fiscal 2021)

1. Gas Equipment/Combustion

1-1	Technology Used in Low-Temperature Heating Drive Equipment
	<ul style="list-style-type: none"> •New technology utilizing heated water up to 90°C and exhaust gas up to 150°C Application Examples: Heating drive equipment for commercial and industrial use (cold heat, heat pumps, steam use, power generation, etc.)
Checklist	<input type="checkbox"/> Water heated to 40°C, 60°C, 90°C can be used. <input type="checkbox"/> Exhaust gas heated up to 150°C can be used. <input type="checkbox"/> Not including binary cycle power generation
1-2	Technology that Contributes to High Efficiency, Cost Reductions and Compacting of Heat Exchangers and Radiators of ENE-FARM
	<ul style="list-style-type: none"> •For further spread of household-use fuel cell co-generation systems, ENE-FARM, soliciting technology that contributes to high efficiency, cost reductions and compacting of its heat exchangers and radiators.
1-3	Synchronous Generator Fault Diagnosis Technology
NEW	<ul style="list-style-type: none"> •Technology for advanced detection of generator fault patterns with basic on-site diagnosis or remote monitoring
1-4	Technology for Simply but Accurately Measuring the Flow of Gas
	<ul style="list-style-type: none"> •Technology outside of multi-purpose accurate flow measuring type, or applied technology that simply but accurately measures the flow of gas •Technology for simple flow measurements that can be attached to already operating combustion equipment piping
Checklist	<input type="checkbox"/> Gas is assumed to be inert gas/city gas <input type="checkbox"/> Inert gas is assumed to be a maximum of about 300°C <input type="checkbox"/> Flow rate indication is unnecessary <input type="checkbox"/> Unmetered
1-5	Ceramic 3D Printing Heat Exchanger
Application Period Ended	<ul style="list-style-type: none"> •Ceramic heat exchangers for exhaust gas that can handle high temperatures (more than 1000°C) that metal cannot withstand •Technology using 3D printing to create complex shapes that other molds and templates can't replicate
Checklist	<input type="checkbox"/> Can determine whether to manufacture following a detailed blueprint <input type="checkbox"/> Create specifications for largest possible production scale <input type="checkbox"/> Presence of leak prevention measures between metal and adhering parts
1-6	Detection Technology for Signs of Cracking in Tube Burners
NEW	<ul style="list-style-type: none"> •Non-destructive Evaluation (NDE) Technology that enables detection of signs of cracking in metal tubes during combustion (1000°C+)
1-7	Thermoelectric Conversion Element (Utilizing Kitchen Appliance Exhaust Heat)
NEW	<ul style="list-style-type: none"> •Reviewing means for leveraging the thermoelectric conversion element to recycle exhaust heat from gas kitchen appliances. •Parts that have high durability against heat and soot to facilitate the utilization of high-temperature exhaust heat (from kitchen appliances) to produce energies and contribute to saving energy.
1-8	Leveraging Hydrogen Combustion Kitchen Appliances
NEW	<ul style="list-style-type: none"> •Searching for ways to leverage (apply and utilize) hydrogen combustion kitchen appliances and machinery •Measures for securing safety and points of caution when using hydrogen combustion kitchen appliances

2. Chemistry, Materials, and Environment

2-1	Technology for Turning Titania (Titanium Oxide) into Paste or Paint
	<ul style="list-style-type: none"> •Turning titania nanoparticles into paste (especially with uniform distribution, concentrate) •Applying a clear coating (formulation and dispersion of inorganic binders) on titania nanoparticles •Turning transparent photocatalyst paint into merchandise (antibacterial, anti-virus, antifouling, anti-fog, deodorant)
2-2	Production or Application Development of Thermal Conductive Resin and Heat Dissipation Paint
	<ul style="list-style-type: none"> •Company that can manufacture heat dissipation paint and thermal conductive resin (including rubber and grease) •Facility that can evaluate thermal conduction and heat dissipation characteristics (thermal conductivity, radiation, and heat dissipation during actual use) •Partner or user who can develop usages for thermal conduction/heat dissipation material including multilayer graphene
2-3	UV or Visible Light Reaction Contractor
NEW	•UV or Visible Light Reaction Contractor (Pilot Production, Actual Machine Production)
2-4	Saline Water Mist Spray Device for Uniform and Consistent Spraying of Steel Plate Surfaces
NEW Application Period Ended	•The spray device provides uniform and consistent spray of fine saline mist onto steel plate surfaces. It is utilized in experiments (pre-processing stage) for producing consistently reproducible rust.
2-5	Technology for Increasing Amounts of Biogas Generated
	•Technology for increasing amounts of biogas generated using an existing methane fermenter (digestion tank)
2-6	IoT Sensors for Water Treatment Use
	•Sensors that can inspect categories of water quality (for example, BOD, n-Hex, etc.) which cannot be evaluated in real time during the water treatment process
2-7	Search for Parts to Measure Residual Chlorine in Real-time
NEW Application Period Ended	•We are searching for affordable sensors with continuous measurement capabilities to expand the monitoring options of our network configured cloud-based temperature and humidity monitoring system.
2-8	Refrigerant (Chlorofluorocarbon) Recycling Technology
NEW	<ul style="list-style-type: none"> •Should be looking into leveraging recycled refrigerants during GHP maintenance. •Technology that can be leveraged for on-site recycling of refrigerants (chlorofluorocarbon) as a provided service.

3. Pipeline/Plant Engineering (1)

3-1	Medium-Pressure Large-Capacity Gas Meter
	<ul style="list-style-type: none"> •Medium-pressure large-capacity gas meter except for turbine gas meters (not including roots type)
3-2	Technology for Non-Destructively Measuring Surface Pressure on a Flange Face
	<ul style="list-style-type: none"> •Technology that can nondestructively measure surface-pressure distribution and surface pressure from outside when tightening the pipe flange
3-3	Automatic Welding Technology for Fillet Welding
Application Period Ended	<ul style="list-style-type: none"> •Establish automatic welding apparatus and conditions for fillet welding at a construction site for steel-insert welded tube fittings for piping
3-4	Technology for Finishing Asphalt Pavement
	<ul style="list-style-type: none"> •Technology that can make clean finished pavement without re-pavement from temporary roads (asphalt pavement) after excavation work •Small-sized cutting machines for cutting in narrow spaces
3-5	Affordable and Lightweight Earth Retaining Works
NEW	<ul style="list-style-type: none"> •Affordable, lightweight, and easy to handle earth retaining work of soft grounds that require excavation of no deeper than 60cm
3-6	Auxiliary Tools for Excavation in Narrow Spaces (Scoop/Earth and Sand Suction)
	<ul style="list-style-type: none"> •Excavation tools capable of excavating even in narrow spaces where it is difficult to operate an excavator
3-7	Earth and Sand Transportation Tools (Equipment) and Automated Transportation
NEW	<ul style="list-style-type: none"> •Technology for efficient transportation of earth and sand from the excavation site to the dump truck
3-8	Domes for Field Work and Other Goods to Counter Heat Stroke
	<ul style="list-style-type: none"> •Lightweight, easily assembled and removable domes (tents) used during excavation/piping work, which allows workers to work under the roof no matter what the weather or season •Other goods that counter heat stroke for field workers

4. Pipeline/Plant Engineering (2)

4-1	Tools for Automatically Collecting and Analyzing Data on Operator Movements
NEW	<ul style="list-style-type: none"> •Tools that utilize AI cameras and skin suits to automatically collect and analyze data on the movements of each operator (excavation, earth/sand transport, pipeline laying, rest etc.)
4-2	Traffic Guidance with Guardsman Robot
NEW	<ul style="list-style-type: none"> •The Guardsman Robot proxies basic tasks of the requisite construction/work site traffic controller. Tasks include giving alerts when people or machinery items come into close proximity of the work area.
4-3	Underground Gas Pipe Positioning Car Navigation System
NEW	<ul style="list-style-type: none"> •After the user specifies the range settings (the gas pipeline route, to be followed that day), the car navigation application will calculate the shortest route and alert the user/driver, with visual or audio information, when they are directly above the gas pipe.
4-4	Autonomous Driving and Automatic Vehicle Location (AVL) Technology for a Locator (Position Identification Device)
NEW	<ul style="list-style-type: none"> •Ground penetrating radar (GPR) equipped autonomous driving technology (able to clear paved/non-paved, sidewalk or road curb/gutters), and non-GPS-use automated vehicle location technology
4-5	Automated Inventory Control System
	<ul style="list-style-type: none"> •A system that can automatically manage inventory counts of consumable materials required for gas fitting work, stored in the warehouse, and alerts the inventory manager when levels are below the specified amount
4-6	Technology for Separating City Gas and Nitrogen Gas
	<ul style="list-style-type: none"> •Incombustible gas or technology that does not mix with city gas •Technology that can separate nitrogen and city gas from mixed gases •Technology that can separate city gas from mixed gases, using incombustible gas replacing nitrogen
4-7	Survey Technology for Concrete Structures (1) (2) (3)
	<p>(1) Technology that can access the places listed below and take photographs of the structures or conduct the hammering test</p> <ul style="list-style-type: none"> ■ Bottom of pier ■ PCLNG tanker breakwater <p>(2) Technology that can automatically grasp the location of diagnostic imaging and hammering test results</p> <p>(3) Database that can save and organize survey results and design conditions of each structure</p>
4-8	Non-Destructive Inspection Method for Detection of the Depths of Concrete Neutralization
	<ul style="list-style-type: none"> •Technology that can non-destructively measure the depths of concrete neutralization in the bodies of rebar concrete structures

5. Collaboration and Co-Creation Activities/Development Partners	
5-1	Collaborative Activity with hu+gMUSEUM (1) (2) (3)
	<ul style="list-style-type: none"> • We offer the hu+gMUSEUM as a space to collaborate. • Solicit ideas and a plan for the event corner that could encourage interest in events • Solicit ideas and a plan for effective use of the kitchen studio and rental hall
5-2	Collaborative Activities at Cooking Schools (1) (2) (3) (4) (5) (6)
	<p>(1) Solicit collaboration plans for cooking classes (tie-up enterprises product PR). Currently we have established tie-ups primarily with food and beverage product manufacturers, kitchenware manufacturers, and life insurance companies.</p> <p>(2) Soliciting businesses to collaborate and offer proposals for events or workshops that leverage large scale video projection technologies at the hu+gMUSEUM.</p> <p>(3) The Osaka Gas Cooking School currently has a male participant (student) ratio of approximately 10%. We aim to improve this by increasing the number of ongoing male participants. Solicit collaboration plans to increase male participants.</p> <p>(4) Solicit plans for personal enrichment activities (for adults) and seminars that connect with cooking courses.</p> <p>(5) Soliciting businesses to convert online lesson recipes into fully prepared meal kits and provide delivery.</p> <p>(6) Solicit food product or restaurant businesses who are seeking menu development or photo/videography of key products. We also plan to solicit businesses to collaborate on product development that leverages know-how in menu development.</p>
5-3	Transmission of Food Culture Using "Amakara Techo" (Food Information Magazine)
	<ul style="list-style-type: none"> • Won't you learn more about Kansai's food culture through the brand knowhow of "Amakara Techo"?
5-4	Supporters Aim to Activate the Region through Sports and Health
	We support administrative and local government activities that promote health of the individual and the region through sports and health initiatives!
5-5	New Application Development Partners for Biodegradable Resin for Inflation Film Molding
	<ul style="list-style-type: none"> • New application development partners for biodegradable resin for inflation film molding with the main component of plant-derived polylactic acid • Film molding consignment partner (inflation molding, T-die film molding)
5-6	New Application Development Partner for Multilayer Graphene
	<ul style="list-style-type: none"> • Application development partner for low-cost, well-dispersed multilayer graphene (lubrication, rubber/resin reinforced, heat dissipation, electromagnetic wave absorption, etc.)
5-7	New Application Development Partner for Titanium Nanomaterials
	<ul style="list-style-type: none"> • Application development partner for high transparency and high-activity catalysts (titania sol nanoparticles) - Application development partners for ultra-high refractive index transparent material (titania nanoclusters)
5-8	New Application Development Partners for MOF Moisture Sorbents
NEW	<ul style="list-style-type: none"> • New application development partners for MOFs, a next-generational porous material with high absorption-desorption capacities.

6. Development Partners	
6-1	New Application Development Partner for Dry Ice Cleaning Technology
	<ul style="list-style-type: none"> •New application development partner for cleaning with dry ice (beads) and dry snow (powder) •Specialized in cleaning for post dyeing process, molds, pulverization and processing industry, and precision mechanical equipment
6-2	New Application Development Partners Utilizing Liquid Powders
	<ul style="list-style-type: none"> •Utilization of liquid nitrogen and freeze-dry methods to powderize liquefied materials while maintaining their efficacies
6-3	New Application Development Partner for Ultra-Fine Pulverization Technology for Pulverizing Resins and Foodstuffs
	New application development partners for cryogenic freeze pulverization treatment technologies using liquefied nitrogen induced low-temperature embrittlement. The treatment is used for pulverizing resins and foodstuffs, which are typically difficult to pulverize at room temperatures, to the desired particle size.
6-4	Application Development Partners in Utilizing Cryogenic Pulverization Technology
NEW	<ul style="list-style-type: none"> •At Osaka Gas Liquid, we are expanding business activities to include the consignment of cryogenic pulverization work (resins and foodstuffs). •Joining with chemical manufacturing consignment firms to meet customer's pulverization needs
6-5	New Application Development Partners in Powderization Technology for Difficult to Pulverize Resins (LCPs, films)
NEW	<ul style="list-style-type: none"> •Succeeded in powderizing materials (LCPs and films) which are difficult to pulverize using existing processes. •From leading edge technologies to helping the environment, Osaka Gas is proposing new possibilities for contractual pulverization processing in a wider range of fields.
6-6	New Application Development Partner on Dry-Processing Technology for Resin Pellets
	<ul style="list-style-type: none"> •New application development partner for dry-processing technology for resin pellets to water-content levels of hundreds of ppm
6-7	New Application Development Partner for Ultra-High-Purity Gas Purifier
	<ul style="list-style-type: none"> •New application development partner for using ultra-high-purity gas purifying technology •Two types: Inline-type and Getter-type Gas Purifiers. Acquire ultra-high-purity gas at a low price.
6-8	New Application Development Partner Using Nozzle for Generating Microbubbles
	<ul style="list-style-type: none"> •Recruiting a partner to use microbubble equipment to increase the amount of dissolved gas ⇒ Development of new applications for warm bathing facilities, agriculture, aquaculture, etc.

7. Service and System (1)

7-1	Measuring Human Activity Flow for AC Control and Marketing
NEW	•Gauging and predicting human activity flow for large-scale commercial facilities to optimize air conditioning control (AC) and marketing
7-2	Calculating Energy-Saving Potential and Improving Energy Management with AI-Driven Big Data Analysis of Heat Sources
NEW	•Leveraging AI-driven analysis of central monitoring board big data, relating to central heat sources of commercial buildings, to uncover energy-saving potential and conserve energy through improved energy management.
7-3	Visualization of Air Quality and AC Optimization with Environment Sensors
NEW	•Visualization of internal air quality, using an affordable and easy-to-install environment sensor (CO2, moisture, and humidity levels), helps in securing and maintaining adequate ventilation levels and optimal air-conditioning.
7-4	Analysis System for Drive Recordings
Application Period Ended	•Labor-saving system that can analyze drive recordings to make driving diagnosis and offer individual instruction
7-5	Technology for 5G Real-time Transmission of Images of Driving Operations
NEW	•Technology for sending dashboard-mounted smartphone captured images of driving operations and vehicle speed data (GPS collected) in real-time via a 5G network.
7-6	Easy-to-Use GUI Creation Tools
NEW	•Tools that enables users to easily create graphic screen for displaying real-time data from either a cloud or local PC
7-7	Remote Sequential Operation System for Commercial-Use Cold Storage and Refrigeration Equipment
	•A system that allows for remote sequential operations for decentralized installation of a variety of commercial-use cold storage and refrigeration equipment to be conducted from a center
7-8	Audio Processing Technology for Server Recorded Audio via a Smartphone
NEW	•Technology for canceling noise from smartphone recorded audio, enabling users transform various audio qualities into clear voice recording files.

8. Service and System (2)

8-1	Service Tool to Contribute High Value Added to Fitness Centers
	•Deliver various services that are not offered at other gyms (equipment/tools/methods)
8-2	New Services for Home Protection and Security
	•Solicit a new menu of home security services including protection of the elderly and children, crime prevention, disaster prevention, and other protective steps
8-3	New Service for Newly Built Residences (Rental Apartments, Houses)
	•OSS resource combined newly developed service for users of newly built rental homes or new house owners (first-time home buyers)
8-4	Energy System that Enables Daily Living for 72-Hours during a Disaster
NEW	•Energy system for paid nursing homes that enables close to normal living conditions for 72-hours during a disaster
8-5	Propane Gas Cylinder Optimal Delivery Method Selection System
Application Period Ended	•System that selects the most efficient and accurate home delivery method for propane gas cylinders
8-6	Daily Living Items Delivery Service
NEW Application Period Ended	•Service that buys and delivers daily-use items, and handles items payments on the users' behalf, for residents around Nabari City.
8-7	Improve Value-Added Signage for Open Innovation
	•Value added functions to optimize the digital signage (panel) that introduces the needs of Daigas Group
8-8	Needs and Seed Matching Accuracy Improvement Tools
NEW	•Tools that effectively matches needs and seeds in Open Innovation activities

Contact for Questions about Technological Needs

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9 . Specific Demand for Information Sessions on Needs

9-1

9-2

Three matters to address.
To be announced on the day at the information session.

9-3

NEW

10. Needs Arisen during the Solicitation Period

10-1	Promoting New Businesses on Privately-Held Land
NEW	•We are looking to turn the 830 lots held by the Pipeline Department, out of the unused privately-held land lots, into viable business spaces.
10-2	Materials for Adsorbing CO2 Present in Helium
NEW	Soliciting materials that can adsorb and selectively extract only CO2 from industrial gases (helium).
10-3	DX Services Aimed at Educational Institutes
NEW	Solicit proposals for high-demand DX services in addition to energy and decarbonization focused added-value proposals.