

New infrastructure X














# **NiX GROUP** **CORPORATE PROFILE**





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## NiX Group Overview



### Engineering Consultants

**NiX NiX Co., Ltd.**

Address : 1-23 Okudashinmachi, Toyama city, Toyama

**Seiko Survey Co., Ltd.**

Address : 5-20 kubomachi, Nishi-ku, Yokohama city, Kanagawa

**NiX Sanki Co., Ltd.**

Address : 4-2-3 hinode Itako city, Ibaraki

**Giken Consultants Co., Ltd.**

Address : 22-9 kanate oomachi, ashikaga-gun, Kanagawa

**Toko Sokken Co., Ltd.**

Address : 213-5 Kurigi Asao-ku, Kawasaki city, Kanagawa

**Shinnetsu Denko Co., Ltd.**

Address : 18-7-4 26Johto Higashiku kita Sapporo city, Hokkaido

**Giken Sekkei Co., Ltd.**

Address : 6-3-1 Maiyacho, Fukui city, Fukui

### Domestic IPP business

**NiX New Energy Co., Ltd.**

**NiX Yuwaku Hydro Power Co., Ltd.**

**Hiraso River Small Hydro Power Co., Ltd.**

### Overseas IPP business

**PT. NiX Indonesia Consulting** (Indonesia)

**PT. Leborg Sukses Energi** (Indonesia)

**PT. Optima Tirta Energy** (Indonesia)

**NiX Holdings Singapore Pte., Ltd** (Singapore)

**ALAM NIX RENEWABLES PTE LTD** (Indonesia)





## IPP Business in Overseas

Our company, as a growth-engine business, is using hydroelectric power generation technology developed in Japan to conduct national hydroelectric power business and perform international business consultations.

With the support of JETRO (Ministry of Economy, Trade and Industry), JICA (Ministry of Foreign Affairs), Ministry of the Environment, and also based on the inter-city cooperation agreement with Toyama City to roll out its policy for a “Future environment city,” we are working to expand renewable energy overseas.

In terms of our international business, we established PT. Lebong Sukses Energi after merging with an Indonesian company in November 2016, and started developing a hydroelectric power plant in Bengkulu Province, Indonesia. In April 2019, we established PT. NiX Indonesia Consulting as a local entity, in Jakarta, Indonesia, to strengthen our international hydroelectric power business structure in terms of development, technology review, and construction management. Furthermore, in November 2019, as our second international hydroelectric power business, we established PT. Optima Tirta Energy and worked on constructing a hydroelectric power plant in Sumatra Province, Western Indonesia.

Now, through NiX Holdings Singapore Pte., Ltd., our regional international business base, we are identifying new projects with a focus on expanding our business and deploying renewable energy in other South-East Asian countries such as Myanmar and Malaysia.

In terms of human resources, in addition to the Indonesian engineers belonging to local entities, we are regularly hiring fresh foreign engineer graduates at our Japanese head office, and are planning to expand our international business further as a growing group. Moving forward, we plan to contribute to the economic growth of the country of interest and the establishment of a sustainable environment by strengthening the development of renewable energy, primarily hydroelectric power, as a power source.

### Indonesia

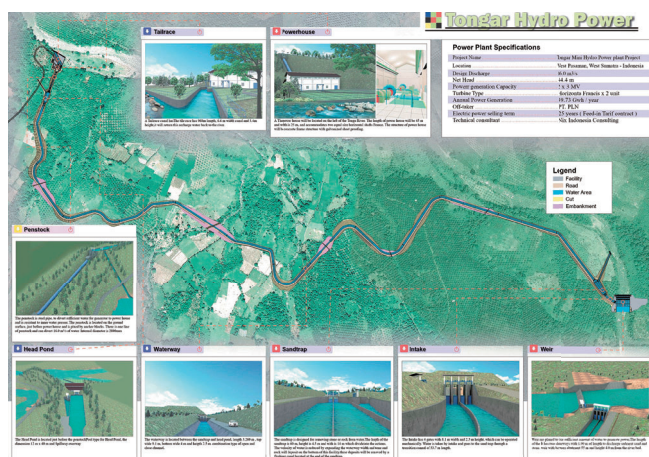
#### [ Own business ]

##### Tongar Hydro Power Plant (Under construction)

In November 2019, through NiX Holdings Singapore Pte., Ltd., (Singapore holding company) in the NiX group, we acquired stock in the PT. Optima Tirta Energy business entity and are currently involved in its execution as a majority shareholder.

In this business, the NiX group is carrying out construction execution management that is centered on a local entity responsible for redesign and engineering, and because of that the group is working to reduce business costs and risks.

Project Name	Tongar Hydro Power Project	Enterprising body	SPC ( PT. Optima Tirta Energy )
Investment	NiX Holdings Singapore., LTD	Location	West Pasaman, West Sumatra, Indonesia
Water consumption	16.0m³/s	Effective head	44.4m
Maximum output	6,200kW	Turbine form	Francis Horizontal x two units
Annual power generation	38.7GWh (46,000 households in Indonesia)	Off-taker	PT. PLN
Electric power selling period	25 years (Feed-in Tariff contract)	Technical consultant	NiX Japan, NiX Indonesia Consulting



#### Weir

Weir and Intake are planning to take a sufficient amount of water to generate power. The length of the weir is 49m and its height is 4m from the river bed. It has two sluiceways with the 2m of length to discharge sediment sand and stone.



#### Waterway

The water way is connecting between the setting basin and head pond.

The purpose of this section is to convey design discharge flow to head pond. The length is 3275m, width is 9.12m, and height is 4.0m.



#### Penstock

The penstock is a steel pipe to divert sufficient water for generator to powerhouse and is resistant to inner water pressure. The penstock is located on the ground surface and is fixed by anchor blocks. There is one line of penstock and can divert 16.0m³/s of water. Internal diameter is 2800mm.



#### Powerhouse

A powerhouse will be located on the right bank of Tongar River. The length of the powerhouse will be 32m and the width is 17m, and accommodate two Horizontal Francis water turbine units, generators, control rooms, and other facilities. The structure of powerhouse will be a concrete frame structure.







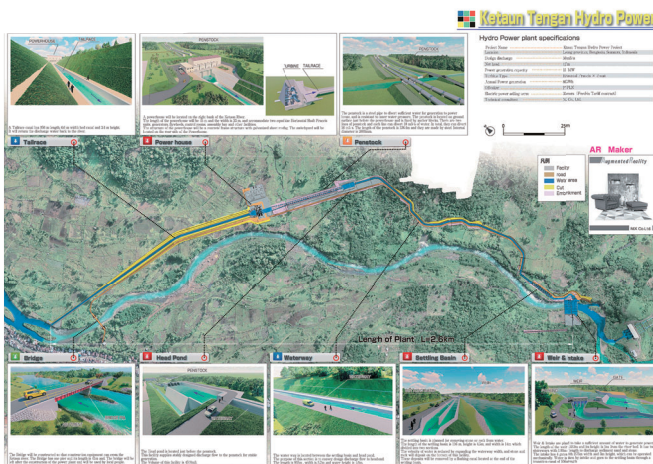
### [ Own business ]

#### Ketaun Hydro Power Plant (In Development)

In November 2016, we established PT. Lepong Sukses Energi in a merger with an Indonesian company, and started developing a hydroelectric power plant (13,000 kW) in Bengkulu Province, Indonesia. In March 2019, this project passed the Indonesian National Power Company PT. PLN DPT inspection (power supplier qualification inspection).

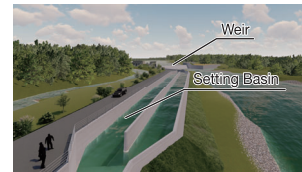
As a power supply company, we will negotiate the conclusion of a power purchase agreement (PPA) and proceed to construction engineering.

Project Name	Ketaun Hydro Power Project	Enterprising body	SPC ( PT. Lepong Sukses Energi )
Investment	NiX Holdings Singapore., LTD	Location	Bengkulu, Sumatra, Indonesia
Water consumption	36.0m³/s	Effective head	41.7m
Maximum output	13,000kW	Turbine form	Francis Horizontal x two units
Annual power generation	86.4GWh (100,000 households in Indonesia)	Off-taker	PT. PLN
Electric power selling Period	30 years (Feed-in Tariff contract)	Technical consultant	NiX Japan, NiX Indonesia Consulting



#### Weir and Intake

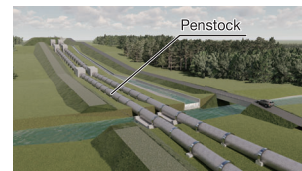
Weir and Intake are planning to take a sufficient amount of water to generate power. The length of the weir is 52.2m and its height is 5m from the river bed. It has two sluiceways with the 1.90m of length to discharge sediment sand and stone. The intake has 4 gates with 2.75m width and 3m height, which can be operated mechanically. Water is taken by intake and goes to the setting basin through a water canal of 106m length.



#### Penstock

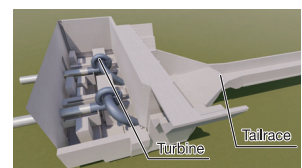
The penstock is a steel pipe to divert sufficient water for generator to powerhouse and is resistant to inner water pressure. The penstock is located on the ground surface and is fixed by anchor blocks.

There are two lines of penstock and each line can divert 18.0m³/s of water. In total they can divert 36m³/s. the length of penstock is 336.4m and they are made by steel. Internal diameter is 2600mm.



#### Powerhouse

A powerhouse will be located on the right bank of the Ketaun River. The length of the powerhouse will be 45m and the width is 23m, and accommodate two Horizontal Francis water turbine units, generators, flywheel, control rooms, and other facilities. The structure of powerhouse will be a concrete frame structure. The switchyard will be located on the rear side of the powerhouse.



### [ Own business ]

#### Roof-top solar power generation (third-party ownership model) project

Roof-top solar power generation (third-party ownership model) project have been attracting attention in recent years as a new way to supply electricity, as it allows each company to convert to clean renewable energy without incurring the initial investment and reduce the cost of electricity consumed. Starting with the first project of 1,700 kW for a pharmaceutical factory of an Indonesian listed company in September 2021, contracts have been concluded for approximately 12,500 kW, of which approximately 6,000 kW has been completed. We will continue to develop our business with an initial target of 50,000 kW over the next several years.



First Project: Solar power generation for a pharmaceutical factory



## IPP Business in Japan

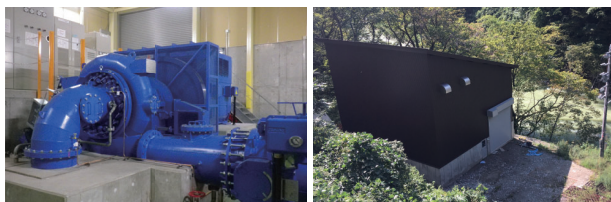
NiX is a small hydro power generation developer who excels at proposing total solutions, from the site development to power-generation planning, fund procurement, construction management, operation, and maintenance. Utilizing our expertise in small hydro power generation, we take part in projects not only within Japan, but in other Asian countries as well, as a private enterprise.



Small hydropower facility design

### Yudani River Small Hydro Power plant

Location	Tamukai, Nanto city, Toyama prefecture
Hydropower generation type	Structure: Conduit type; Water utilization method: Run-off-river type
Output	Approved maximum capacity: P = 843 kW Annual power generation: Approx. 4,111 MWh (approx. 1,200 households' worth)
Start of operation	January 7, 2019
Water consumption	Maximum discharge: 1.3 m³/s
Head	Effective head: 73.0 m
Equipment	Water turbine: Horizontal Francis water turbine (x1) Generator: 3-phase induction generator (6.6 kV, 60 Hz) (x1) Penstock: Ø 800 (L = 1,260 m)



### Hiraso River Small Hydro Power plant

Location	Nakato-machi, Kanazawa City, Ishikawa Prefecture
Output	198 kW
Start of operation	May 7, 2015
Estimated annual power generation	Approx. 976 MWh (approx. 270 households' worth)
Head	Effective head: 17.17 m
Water consumption	Maximum discharge: 1.5 m³/s
Equipment	Water turbine: S-shaped tubular water turbine Generator: Horizontal-shaft 3-phase induction generator Penstock: 800 mm dia



### NiX Yatsuo Solar Power

Location	Kami-Sasahara, Yatsuo-machi, Toyama City
Output	1,260 kW (power conditioners: 1,260 kW; solar panels: 1,416 kW)
Start of operation	October 1, 2014
Estimated annual power generation	Approx. 1,233 MWh (approx. 300 households' worth per year)
Equipment	Solar panels: polycrystalline panels (295 W × 4,800 panels) Power conditioners: 630 kW × 2 units Stands: Frames fixed on ground screws (H = 1.5 m)



### Kanazawa Yuwaku Small Hydro Power Plant

Location	Yuwakumagari-machi, Kanazawa City, Ishikawa Prefecture
Output	160kW
Start of operation	April 2, 2022
Estimated annual power generation	1,176MWh(280 households' worth)
Head	Effective head : 77.7m
Water consumption	Maximum discharge : 0.26m3/s
Equipment	Water turbine: Reverse running pump turbine(x1) Generator: 3phase induction generator(x1)







## Infrastructure inspection / repair / life extension planning

To deal with the growing amount of maintenance management fees caused by the aging and deterioration of infrastructure facilities, it is necessary to quantitatively grasp the deformation / deterioration of infrastructure through inspection and shift to preventive maintenance management, in order to conduct appropriate repair / reinforcement actions according to performance degradation.

By consistently working on a series of task processes in inspection / diagnosis, evaluation, planning/design, repairs, etc., we will contribute to precise and efficient / effective operations while ensuring safety and reducing costs to maintain and upgrade infrastructure facilities.

### Road Facility Life Extension Planning

We have established a database of ledgers and are considering LCCs and drawing up repair plans to contribute to the promotion of PDCA cycles related to the maintenance and management of structures.

- Road maintenance management planning
- Road surface property investigation
- Consideration of life cycle costs, etc.
- Repair design



Road surface property investigation

### Structure Facility Life Extension Planning

There has been a significant deterioration in road structures that are rapidly constructed and in large numbers during periods of high economic growth. We are providing support for drawing up life-extension and repair plans for road infrastructure.

- Structure monitoring survey
- Executing repair and reinforcement designs



Inspection by our own bridge inspection vehicle

### Structure survey inspections Repairs and reinforcement design

We are inspecting and performing detailed surveys on road infrastructures, considering repair measures according to damage impacts, and performing detailed design after selecting the optimal repair and reinforcement methods.

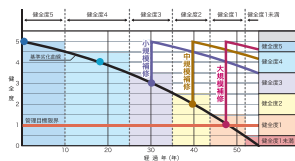
- Structure inspection work
- Inspection, survey, repair, and reinforcement design for bridges and disaster prevention structures
- Coating survey / non-destructive inspection
- Concrete deterioration survey / materials test



Inspection applying photographic technology (by our own UAV)

### Bridge life extension plan

Bridges, which are the key element of road stock that was constructed rapidly and in large numbers during the period of high economic growth, are showing remarkable deterioration.



Related to between bridge repair division and management target limit

- Collection of bridge foundation data
- Bridge soundness evaluation / judgment of importance
- Consideration of deterioration predictions
- Consideration of repair / reinforcement measures / budget calculation

### Park life extension planning

With increase in park stock, there has been a rapid deterioration the facilities; thus, planned and efficient renewal of facilities is required. Based on our extensive experience in park design, we are providing optimal renewal and repair plans.

- Park facility soundness and barrier-free surveys
- Park regeneration surveys and drawing-up plans



### Inspection of soil erosion-related facilities life extension planning

The currently existing soil erosion-related facilities were established 100 years ago and the total soil erosion dams in the country was over 60,000 units, many of which were constructed between 30 and 50 years ago. We are reviewing the methods of inspecting facilities, evaluating soundness, measuring priority order, and measuring methods, as well as follow-up methods from the perspective of protecting facilities that need to be conserved. Moreover, we are carrying out life extension planning to establish the scheme for measures in the annual plan.



- River channel planning / detailed seawall design
- Structural seismic reinforcement design
- Soil erosion foundation survey

### Sewage facility stock management maintenance management and renewal plan

It has become necessary to draft a total stock management plan for facilities owned by local governments from the perspective of life-extension planning for each facility. We shall perform a survey / deterioration diagnosis for the sound maintenance of sewage facilities, draft a facility life extension / stock management plan, and propose appropriate maintenance management / renewal plans.

- Facility surveys / diagnosis
- Life extension planning / maintenance and management plan proposals
- Renovation / renewal execution design



Inspection by pipe opening camera





## Roads / Bridges

To establish a strong and flexible country, it is necessary to work on the strengthening of the land and on disaster prevention / reduction. Through the improvement and conservation of social capital that supports people's lives in the local community from a multifaceted perspective of people / landscape / environment / disaster prevention, we support the offering of a "secure / safe / satisfying" living environment to users.

### High-Standard Trunk Roads

We are providing our long-term technical experience and abundant know-how from the route design stage to that of detailed design.

- Road planning
- Junction design
- Summary, reserves, detailed design
- Traffic safety measure design



Overpass crossing design and surrounding facility design

### General roads, streets



Prefectural road detailed design

These are the roads essential for daily transportations from automobiles to pedestrians. We are providing safe and simple designs that are readily applicable in accordance with the needs of the region.

- Level crossing design
- Overpass crossing design
- Pedestrian barrier-free design
- Station square design

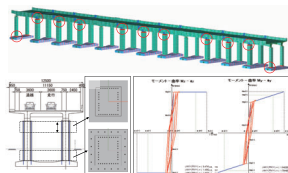
### Structure Design



Bridge reserves / detail design

We select and design the most suitable methods from road structure reserves to the detailed design.

- Bridge reserves / detailed design
- Numerical analysis (2-D and 3-D FEMs)
- Concrete thermal stress analysis
- Underground structure design
- Bridge seismic reinforcement design



Existing bridge seismic reinforcement check

### Road ancillary facilities



Road accessory inspection

For ancillary facilities, such as guard fences, signs, and lighting, we ensure adequate performance adhering to road standards, as well as consider maintenance and management while creating a stable and safe road environment for road users.

- Ancillary structure design
- Wire common trenches, information BOX

### Disaster prevention



Slope collapse Slope measure design

Recognizing the importance of "road disaster prevention inspections," which can be said to be a health check for roads, we plan to propose and design measures not only for handling disasters but also for preventing disasters in advance.

- Disaster prevention chart
- Slope measure design
- Rockfall measure design
- Disaster recovery measure design



Rockfall guard fences



## Rivers, Soil Erosion / Coasts, Oceans / Agriculture

By realizing the seismic resistance and life prolongation of infrastructure facilities managing river control and water resources to conserve the entire watershed, we will work on social development that utilizes existing infrastructure in a useful and effective way while ensuring regional safety/security.

At the same time, to conserve the benefits brought by watersheds, we will investigate the possibility of natural regeneration energy for a low-carbon society, as well as make plans / designs.

### Rivers / Soil Erosion

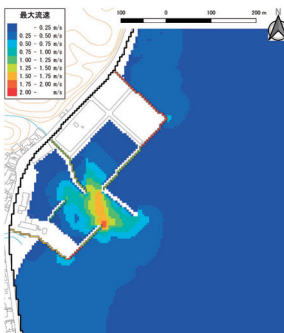
With climate change in recent years, many disasters related to rivers, and soil erosion have occurred; thus, it is necessary to maintain rivers and soil erosion against these disasters to protect the lives and property of residents. We provide total support, encompassing both software and hardware, to prevent such disasters in advance.

- Detailed design of seawalls
- Structural seismic reinforcement design
- Steel pile revetment repair plan
- Nature restoration projects
- Sluice gate reserve design
- Flooding hazard map



Structural seismic reinforcement design

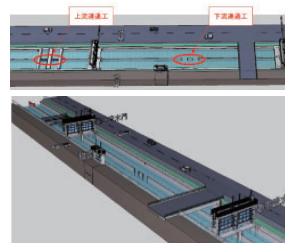
### Fishing harbors / ports



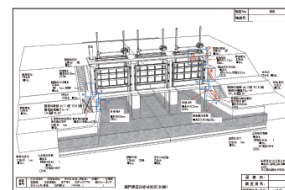
Tsunami simulation

For long-existing deteriorated facilities that have been in operation for several decades, we provide total support from survey and inspection for current facilities to lifecycle-planing proposals.

### Agriculture



We are designing surveys and diagnoses of facilities such as irrigation channels drainage channels and ponds, with the aim of improving the agricultural environment for the provision of a stable social foundation. We are also drafting conservation plans, and performing renewal designs for facilities.



Water use facility function maintenance plan

- Irrigation facility design / business planning
- Diagnoses related to the drawing up of functional conservation plans

### Coasts / Oceans



Wave dissipating works seismic reinforcement design

The conservation of coastal regions at the boundary surrounding our nation is a vital issue for our country's development, so we are providing comprehensive proposals and support.

- Coastal erosion countermeasure survey plan
- Coastal conservation facility reserve detailed plan

### Environment / New Energy



Small hydropower plant planning design

To pass on a healthy and sustainable environment to our descendants in the next generation, we are making proposals that contribute to creating low-carbon, recyclable, and symbiotic societies with a virtuous cycle that considers the region, economy, and environment.

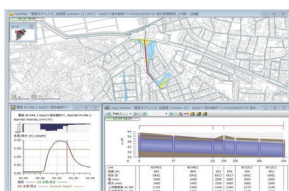


## Water supply and Sewage

We plan the earthquake resistant facilities that support the maintenance and renewal of water and sewage facilities, and are resistant to huge earthquakes. We also conduct flood control planning using high quality flooding analysis simulation. In addition to ensuring citizen safety through such hard infrastructure construction, we complement with soft infrastructure measures such as inland water hazard maps and BCP plan. Finally, we support the strengthening of disaster prevention in whole urban areas.

We also design stock management plans and sewage business plans which are new type of business under Sewage Law (revised in 2015), and contribute to the sustainable operation of sewage business through strategic maintenance and renewal plans.

### Water supply and sewage planning, design and construction supervision



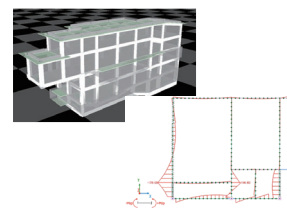
- Basic and detailed design
- Construction supervision

We support whole plans and business approved plans for water and sewage as well as agricultural settlement projects and basic and detail and construction.

We provide total support for development plans from the planning to the designing and construction stages.

### Seismic diagnosis / earthquake resistance planning

We are providing total support for seismic performance surveys / diagnoses, earthquake resistance planning, and seismic reinforcement design to enable water supply and sewage facilities to meet optimal performance requirements even in the event of earthquakes.



Composite structure L2'Seismic diagnosis

- Earthquake resistance performance surveys / earthquake resistance diagnoses.
- Earthquake resistance reinforcement planning

### Rainwater control plan

We evaluate the risk of flooding by flooding analysis simulation, and suggest flooding countermeasure plans utilizing existing stocks.

We totally support flooding countermeasure plans include soft infrastructure measure such as inland water hazard maps.

- Flooding analysis simulation
- Flooding countermeasure plans
- Countermeasure facility plan
- Inland hazard maps
- Soft infrastructure countermeasure support such as self-help and community cooperation



Inland hazard maps, Regulating reservoir design

### Business Continuity Planning (BCP)

BCP refers to the drafting of action plans to enable swift recovery of facility functionality (at the service level) in situations that there are restrictions such as damage to the water supply and sewage facilities or power outages after the occurrence of an earthquake. We provide total support ranging from the drafting of BCP to the provision of emergency response drills in accordance with the manual after their drafting.



Setting an emergency inspection route (Sewage Business Continuity Planning)

### Sewage facility stock management maintenance and management / update plan

It has become necessary to draft a stock management plan for all facilities owned by local governments from the perspective of life extension for each facility. We shall provide a survey / deterioration diagnosis for the purpose of maintaining the structural integrity of the sewage facilities, as well as drawing up facility life extension / stock management plans and proposing appropriate maintenance management / update plans.



- Facility surveys / diagnosis
- Renovation / renewal execution design

Inspection by pipe opening camera

### Sewage Business Plans

It is imperative to create new "Sewage business plans" that add "Inspection methods / frequency" and "mid-term facility installation/improvement policy" to the sewage business plans that have been central to traditional construction planning.

We are using our knowledge of work planning to provide total support for sewage business operations.

- Drawing up business management plans
- Stock management plans





## Landscape Design

As we welcome the age of more matured cities, it is necessary to create new towns that match the lifestyles of the people.

We are working daily, primarily in terms of large-scale development, to create beautiful and comfortable cities, and are providing plans to meet a diverse range of needs.

### Park and Greenery Planning

In recent years, the public's needs in regard to parks and greenery have diversified. We are using functions related to greenery such as the maintenance of the environment and landscape formation. We are also proposing attractive parks / greenery that optimally use the surrounding environment and regional features.

- Urban park concept formation, planning, and design
- Townscape facility (lighting / sign) design

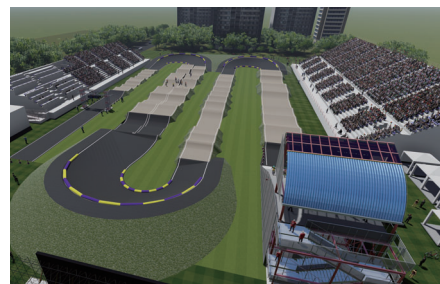


General park design

### Sports facility plans

Although there is a growing interest in sports / recreation because of increased concern about health issues, the current situation is one such that facilities themselves have deteriorated and cannot meet such growing requirements. We have a rich track record in both design and renovation design of newly established facilities as well as existing facilities, and we are proposing various plans.

- Stadium design (baseball, soccer, rugby grounds, etc.)
- Recreation facility design (park golf courses, multi-purpose open lawn spaces, etc.)



Sports facility plans

### Development / creation plan

There is high growth in new designs for factories / companies because of corporate risk diversification and BCP. We are cooperating with both design and development applications.

- Industrial park, corporate housing development design
- Land readjustment, housing development design
- Application for developmental activities



Within the land readjustment district station square design

### Park life extension planning

With increase in park stock, there has been a rapid deterioration the facilities; thus, planned and efficient renewal of facilities is required. Based on our extensive experience in park design, we are providing optimal renewal and repair plans.

- Park facility soundness and barrier-free surveys
- Park regeneration surveys and drawing-up plans





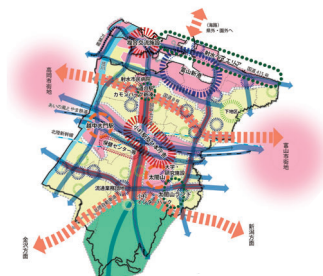
## Urban Planning

The underlying concept of town- and environmental-buildings is significantly changing because of the decrease in population, low birth rate, aging population, global warming, and diversification in people's sense of values. Therefore, there is a requirement for planning that can make areas / living spaces safe and comfortable and revitalize regional and urban economies.

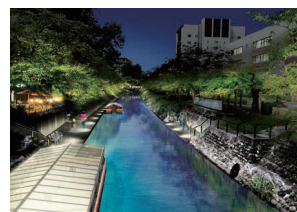
We are proposing building plans that suit the regional situation, focusing on “urban / regional planning,” “transportation planning,” and “environmental and renewable energy planning” to build cities and regions in which citizens and residents can reside in comfort.

### Urban / Regional Planning

We are considering our plans for town building to help form towns that are easy to live in as well as attractive and socially active. We are using the features of the town and proposing plans based on the requirements and perspectives of the residents of the region.



Future urban structure map



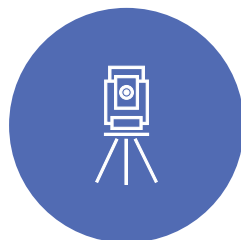
Night landscaping simulation

### Disaster Prevention Plan, Business Continuity Planning (BCP)

Natural disasters and large-scale disasters may occur anywhere. Using the lessons learned from disasters experienced to date, we are supporting the creation of regional disaster prevention plans based on actual regional circumstances with a focus on forming robust cities that are prepared for all potential disasters. Moreover, we are preparing for all eventualities and supporting the investigation of plans (such as business continuity plans) to enable business to continue even in times of disaster.



Hazard map



## Surveying / Compensation

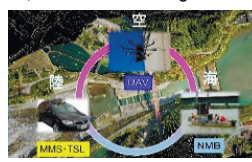
Surveying is the basis and start point of a company's construction department; it involves the measurement of accurate positional information within the country and creating spatial data. In recent years, with the development of surveying technology that makes use of satellite navigational systems, high-precision data can be collected in a short time period and interpreted results are promptly provided. Our company is working to ensure efficient operations by using GNSS measurement devices and TS / mobile mapping systems from base station surveying to site surveying. Furthermore, to meet the demands of the diverse requests of clients and the provision of high-quality results, we are not only improving the technical ability of our engineers but are also obtaining high-quality information such as technological innovations of survey peripheral devices. Moreover, we are positively deploying and applying such devices.

### 3-D Surveying

We are using ICT technology to improve productivity in the field. Using various 3D surveying devices, we can acquire comprehensive high-precision and high-density data in a short time period, even when working in diverse topographical conditions such as land, sea, and sky.

We are modeling the acquired data in 3D and providing it to a diverse range of fields.

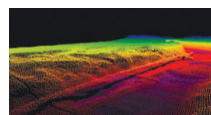
Land, sea and air sensing technology



Measurement from the sky



Measurement at sea



Public sectional map



Cadastral

### Land Registry Survey

The land registry survey is performed mainly in those cities, wards, towns, or village that will be the commissioning bodies. It is a survey performed with the aim of protecting land as an important asset, thus clarifying its correct position, boundaries, land category, and area.



## DX

Local regional bodies are expected to conserve social infrastructure using new technology such as IoT, Big Data, AI, and 5G when faced with a large number of issues such as responding to the ultra-aging society, revitalizing the regional economy, and reestablishing social infrastructure. Our company is using its technical prowess in ICT to realize a digital transformation with local government bodies, residents, and private corporations, and contribute to realizing a regional society with a bright future.

### Road DX

Road Maintenance and Management Cloud Service "Michikura"  
Supporting reforms in the way local governments work and improvement of services for residents through "centralized management," "rapid information linkage," and "visualization of information" of road maintenance and management data by combining cloud and AI technologies.

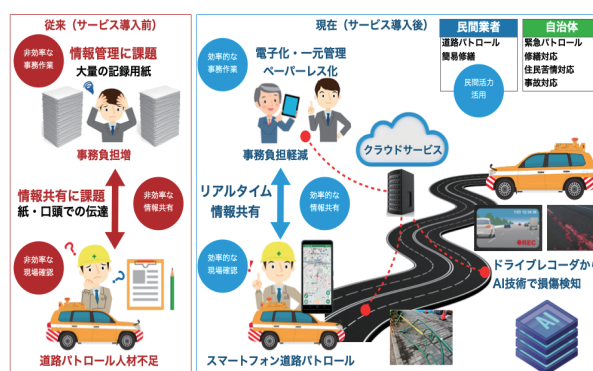


道路維持管理クラウドサービス  
**みちくら**

#### Service Overview



#### Effects of introduction "Michikura"



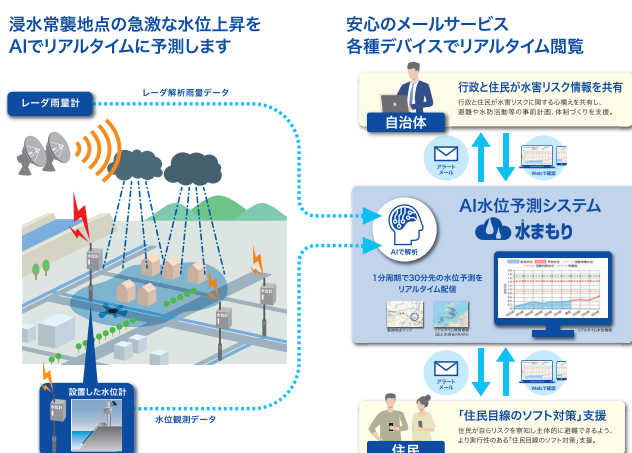
### Flood control DX

AI Water Level Prediction System "Mimamori"  
Support for effective soft measures by sharing preparedness for flood risks among government and residents, and establishing advance plans and systems for evacuation, flood prevention, etc.



AI水位予測システム  
**水まもり**

#### Service Overview



#### Effects of introduction "Mimamori"







## Collaboration between industry, academia, and the government business

With the collaborations between the industry, academia, and government, we are selecting potential future technologies and promoting research and development through cooperation with universities and private companies with such technologies. We are involved in collaboration between industry, academia, and government, with local governments as verification fields.

### Rainwater management systems in case of localized / concentrated heavy rainfall in urban areas

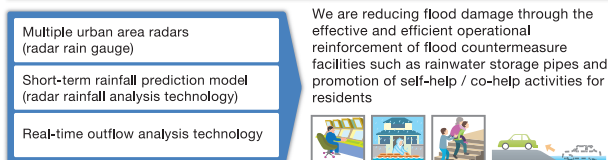
We are reducing flood damage through the effective and efficient operational reinforcement of flood countermeasure facilities such as rainwater storage pipes and promotion of self-help / co-help activities for residents

#### Essentials of Verification Projects

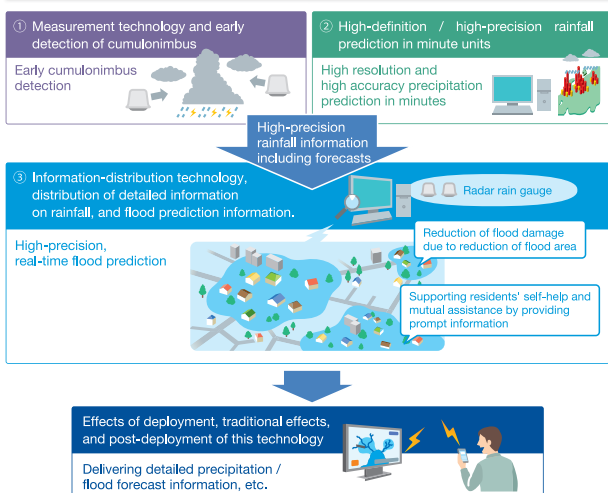
Concerning revolutionary technologies aim at reducing flood damage through rainfall and flood prediction systems using compact radars, we are confirming its efficiency in flood reduction through the deployment of revolutionary technology resulting from the installation and operation of a verification field system.

Specifically, we are constructing an urban area radar network that can detect early rainfall using radars with minute meshes that are cheaper, smaller, and narrower than traditional sewage field radars. Moreover, we are constructing a system that integrates flood and short-term rainfall prediction models based on high-speed flow analysis. In this manner, we are promoting self- and co-help based on rainfall and flood prediction information and clarifying the effects of flood damage reduction by maximizing the capabilities of existing rainfall countermeasure facilities.

#### Concept of verification technology



#### Technology overview



### Approach to “Verification of smart operation of contaminated water manhole pump using ICT technology (Cloud AI system)” in the 2019 B-DASH project

#### Essentials of Verification Projects

There are 47,000 contaminated water manhole pumps (hereafter, manhole pumps) installed nationwide. With the yearly increase in the cost of maintaining and managing / renewing deteriorated facilities for local-government with a large range of pumps, the shortage of maintenance and management personnel is becoming a major issue. To address this issue, the manhole pump maintenance, management, and IoT measurement data for this business have been one-stop managed in the cloud. Moreover, using AI technologies to detect abnormalities and predict deterioration, we verified the efficiency of the manhole pump maintenance and management as well as its effect in reducing life cycle costs (LCC). The verification field covers Toyama City, which has a large number of manhole pumps, and we have finished installation of IoT devices in 67 of the approximately 360 locations, and are now rolling out verification

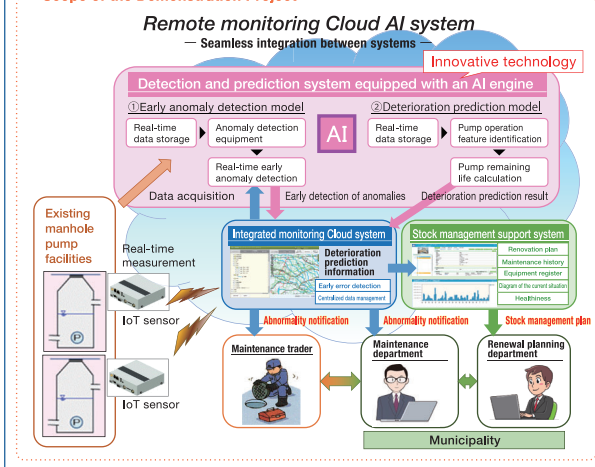
#### Current issues

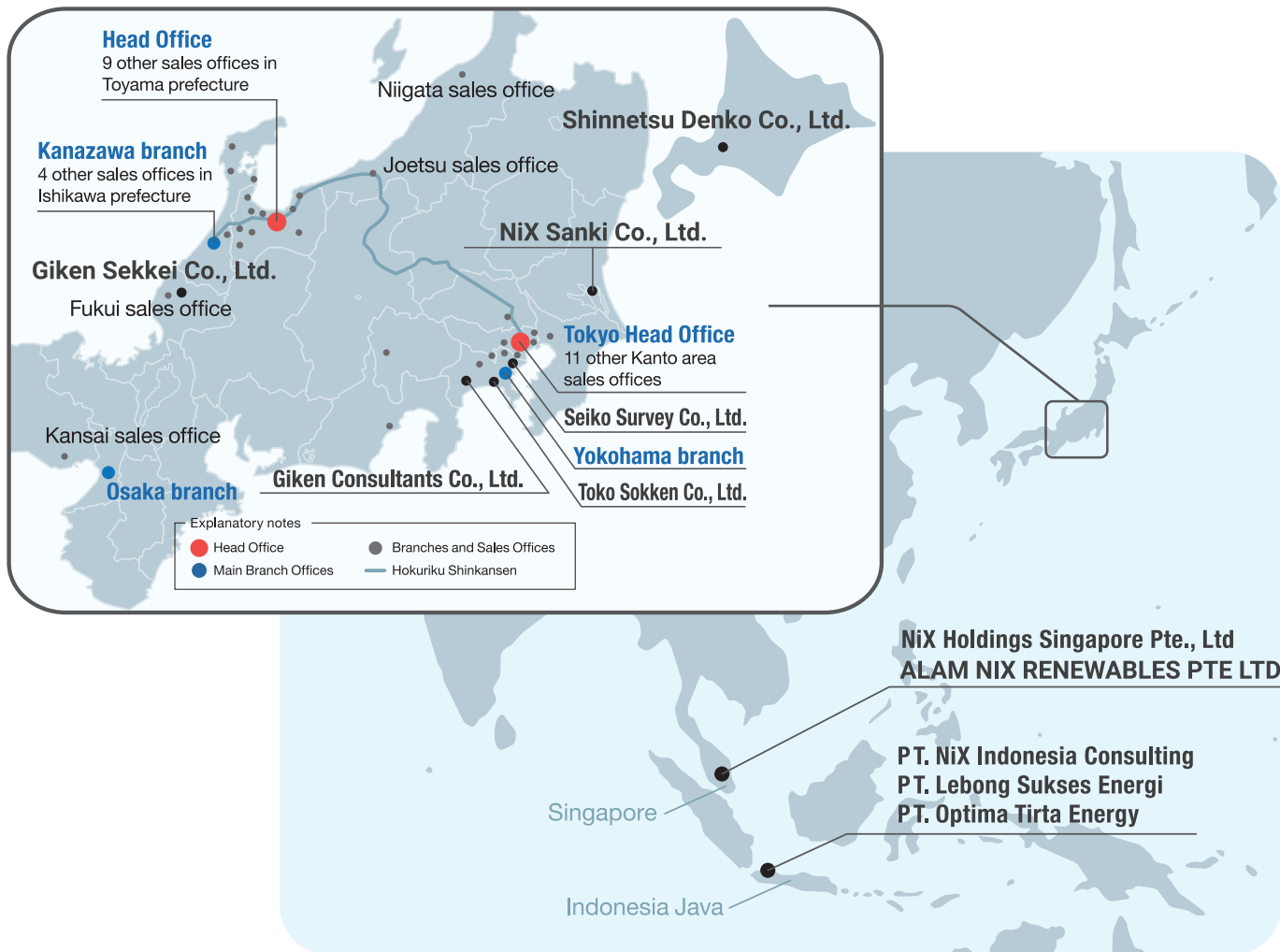
Uniform inspection based on the past few years equipment replacement, maintenance, and management of manually performed work and lack of resources in the stock management field.

#### Verification tests

By supporting maintenance and management for individual pumps and stock management using IoT, we are resolving the issue related to the shortage of resources in the field.

#### Scope of the Demonstration Project





## Company Overview

Company Name	NiX Co., Ltd.
Head Office	1-23 Okudashinmachi, Toyama city, Toyama 930-0857
TEL	+81-76-464-6520
FAX	+81-76-464-6671
E-mail	info@shinnihon-cst.co.jp
Established	April 1979
Company representative	Tomoaki Ichimori, President & CEO
Capital	80 million yen
Sales (FY2022: 2021.7.01-2022.6.30)	3.58 billion yen (NiX) 5.42 billion yen (NiX Group)
Company Name	PT. NiX Indonesia Consulting
Head Office	Menara Jamsostek, North Tower, Lt 14 Jl. Jend. Gatot Subro Kav.38 Jakarta Selatan 12710
TEL	+62-52962280
FAX	+62-52922836
Established	April 2019
Company representative	Wataru Yoshio, President Director



Head Office 1-23 Okudashinmachi, Toyama city, Toyama 930-0857  
TEL: +81-76-464-6520. FAX: +81-76-464-6671

Tokyo Head Office 6-1-1 Higashi-Ueno, Taito-ku, Tokyo 110-0015  
TEL: +81-3-6802-8876. FAX: +81-3-6802



[shinnihon-cst.co.jp/en/](https://shinnihon-cst.co.jp/en/)

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