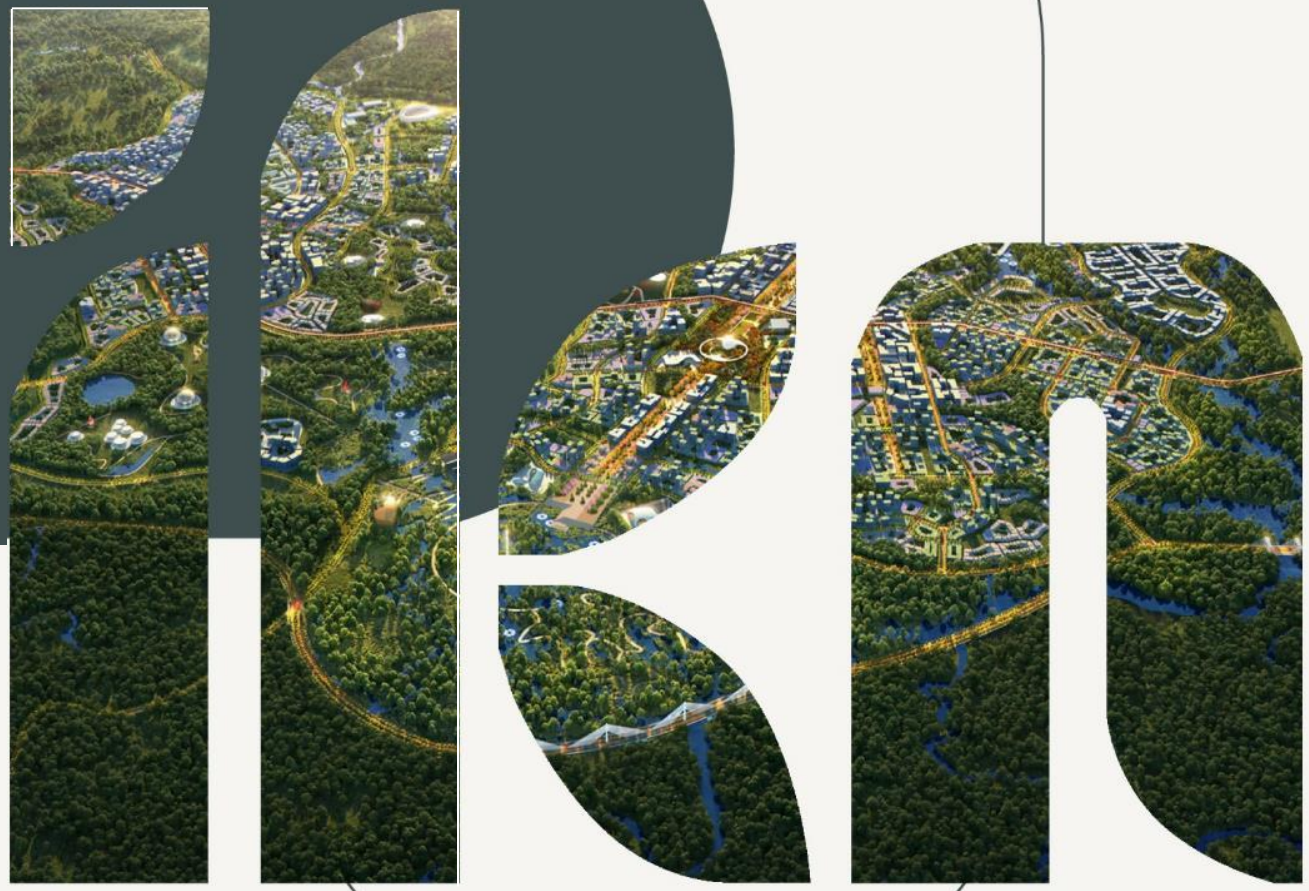
NUSANTARA

Nusantara

Smart and Sustainable Forest City

Overview and Opportunities



Prof. Ir. Mohammed Ali Berawi M.Eng.Sc, Ph.D

Deputy of Green and Digital Transformation
Nusantara National Capital Authority

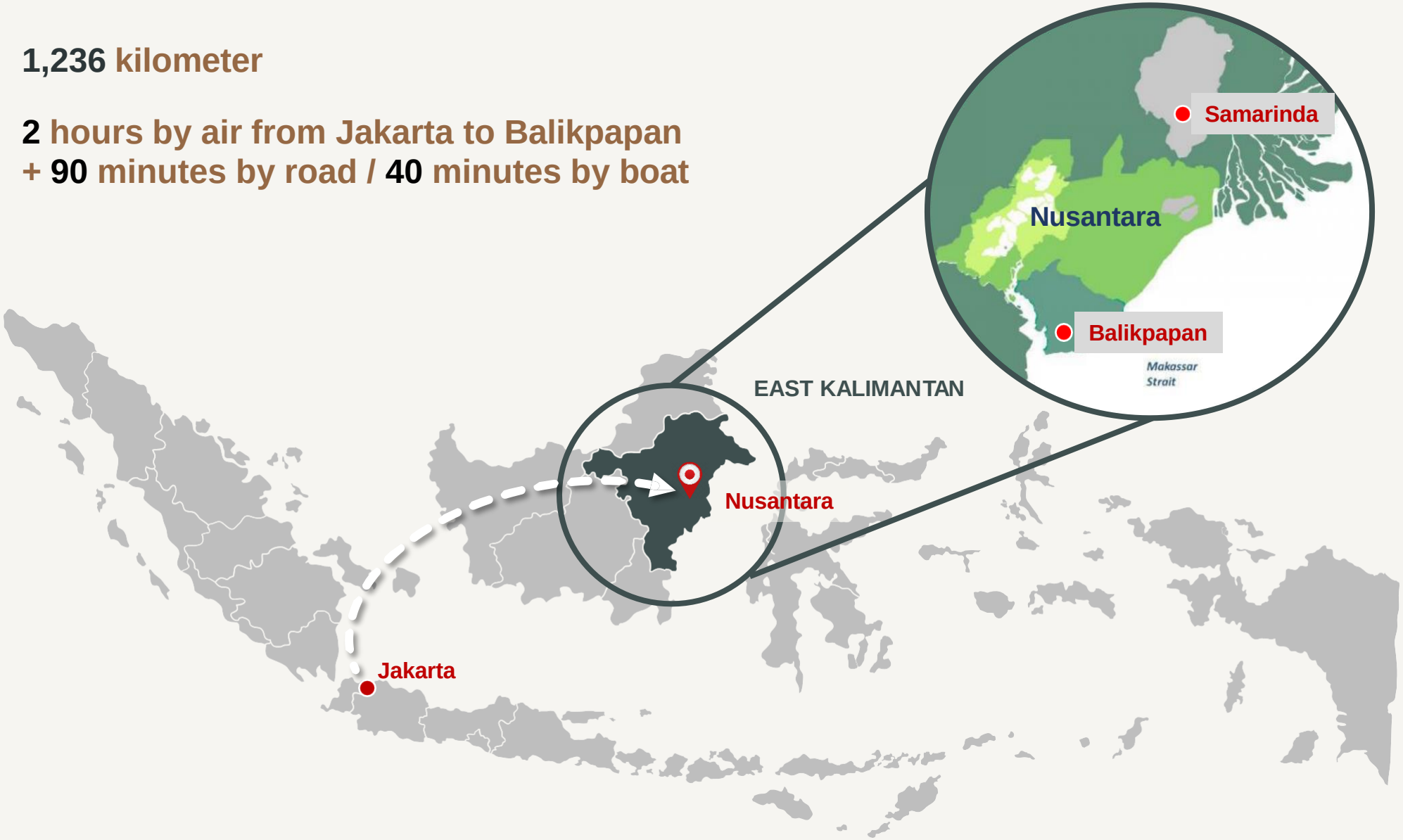
2024

Presented for Hebronstar

Jakarta to Nusantara

1,236 kilometer

2 hours by air from Jakarta to Balikpapan
+ 90 minutes by road / 40 minutes by boat

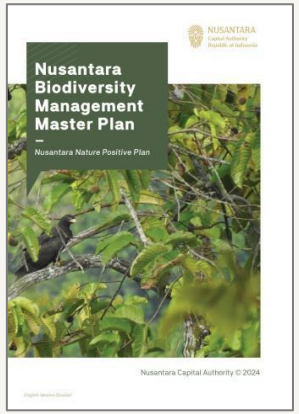


Nusantara as Indonesia's Active Contribution in Global Sustainability Campaigns

CLIMATE CHANGE
"Nusantara Net Zero Strategy 2045" was launched in COP-28 in Dubai.
➔ *Indonesia's first city with locally-and regionally-determined contribution (LRDC)*

SUSTAINABLE DEVELOPMENT GOALS
Nusantara's baseline Voluntary Local Review (VLR) was launched at UN-ESCAP, Bangkok, in February 2024.
➔ *Indonesia's first VLR that is fully aligned with net-zero goal*

ENVIRONMENT, SOCIAL, AND GOVERNANCE (ESG)
An ESG committee is established to help align Nusantara's planning and decision-making with ESG principles, enhancing the city's sustainability and credibility.
➔ *Indonesia's first city with an ESG committee*



BIODIVERSITY
"Nusantara Nature Positive Plan", the city's commitment to ensure wildlife habitat's existence and security, was launched in March 2024. It aligns with Kunming-Montreal Global Biodiversity Framework.

Nusantara's Knowledge Journey: International Collaboration (selected)

Thirteen (13) United Nations agencies have declared their support for Nusantara's endeavors in achieving Sustainable Development Goals.

ESCAP Economic and Social Commission for Asia and the Pacific
UNDP
International Labour Organization
UN WOMEN
IOM UN MIGRATION
unicef
UNFPA
Food and Agriculture Organization of the United Nations
unesco
UN-HABITAT
UN environment programme
UNIDO UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNOPS

Coordinated by:
UNITED NATIONS INDONESIA

CENTRE for Liveable Cities — Knowledge exchange on developing livable city

TONY BLAIR INSTITUTE FOR GLOBAL CHANGE — Business case preparation and strategic communications support

WWF — Biodiversity assessment and wildlife protection framework

Stanford | Doerr School of Sustainability — Research partnership on sustainability

ADB — Comprehensive support toward achieving Nusantara's net-zero goal

USAID FROM THE AMERICAN PEOPLE — Development of Nusantara's smart city masterplan

WORLD RESOURCES INSTITUTE — Development of science-based climate targets

HYUNDAI — Proof of concept for advanced air mobility

Nusantara's Scope of Development

Total Area
Land & Water IKN
322,429 Ha

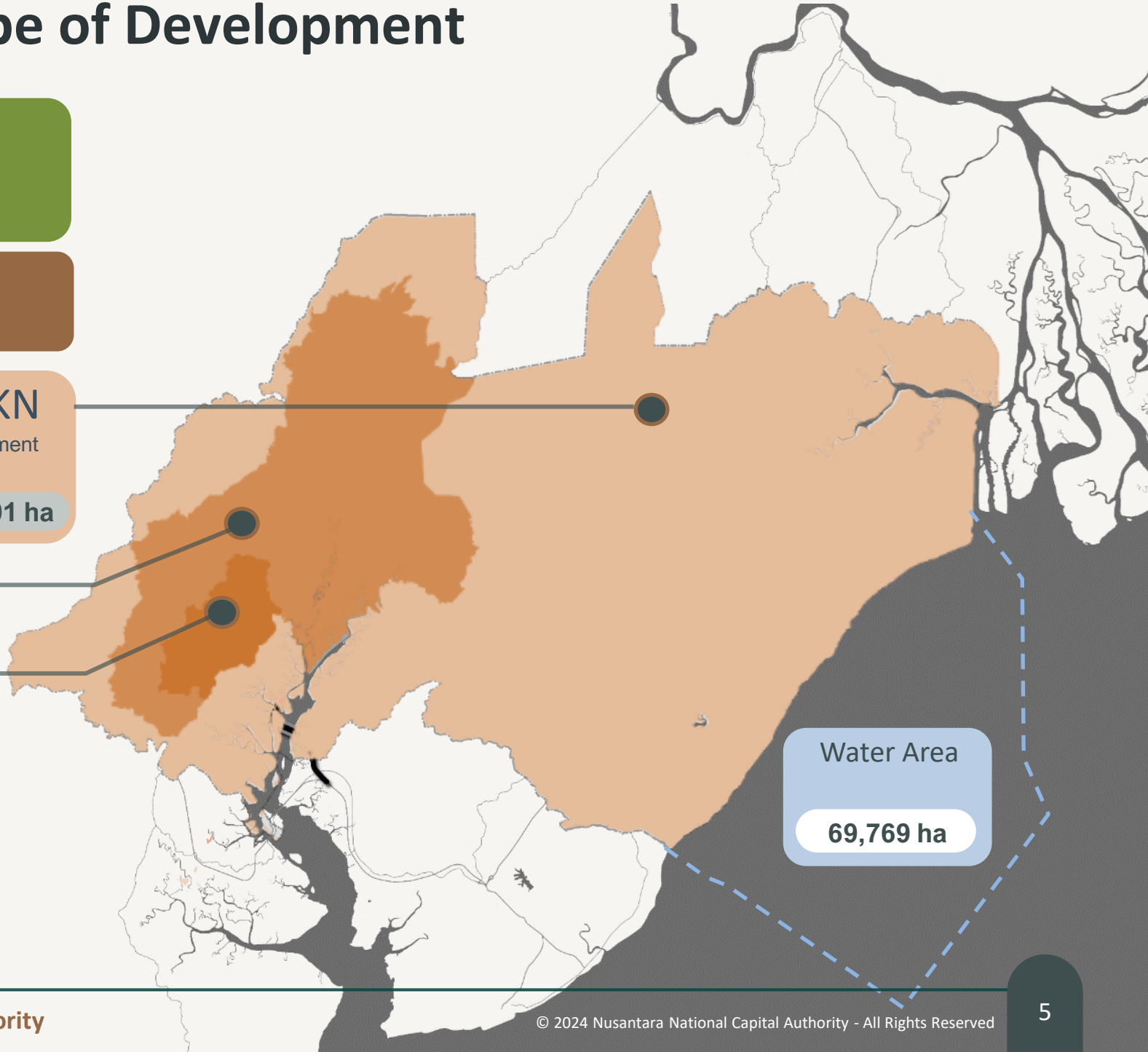
Land Area
252,660 ha

KIKN
Urban Area
56,159 ha

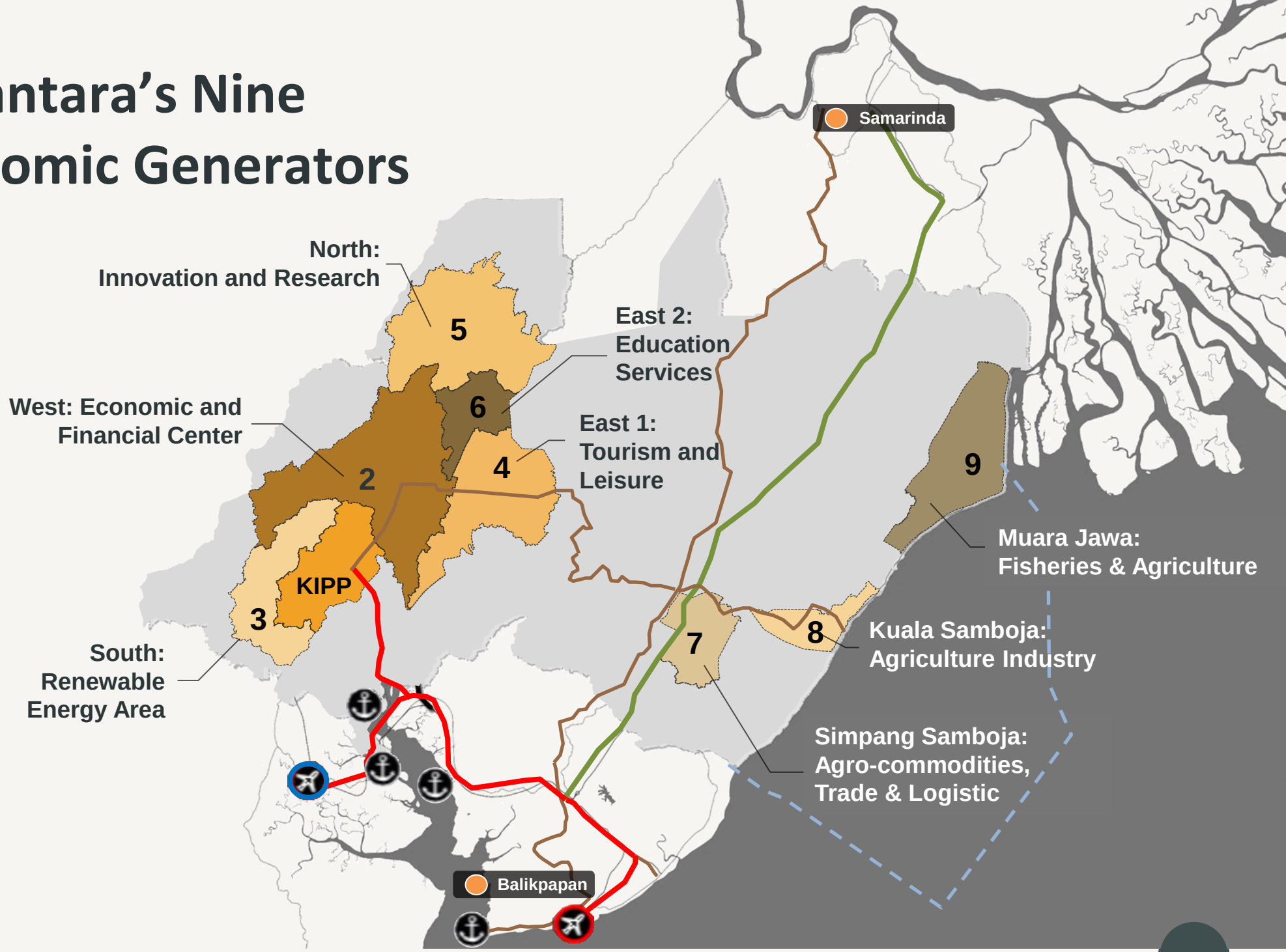
+

KP-IKN
Development Area
196.501 ha

KIPP
Government Core Area
6,671 ha



Nusantara's Nine Economic Generators



Nusantara Development's Principle

A Modern City of the Future

Green

Resilience

Sustainable

Inclusive

Smart

Nusantara: Green, Resilient, and Sustainable City

Tropical forest are preserved as a carbon sink and built area are controlled to minimalize emission and footprint

10%

Parks and food production area

65%

Tropical Forest through Reforestation

25%

Urban built area

Green and Blue Corridor Integration to increase absorption

City landscape to reduce water runoff

Goal: To become carbon-neutral city by 2045

Nusantara Smart City Infrastructure Layers

Application

Smart City

- Smart Governance
- Smart Transportation and Mobility
- Smart Living
- Smart Natural Resources and Energy
- Smart Industry and Human Resources
- Smart Built Environment and Infrastructure

Active Infrastructure

Command Center and Data Center

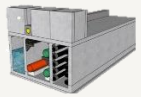
Fiber Optic Cable Networks

Fixed Broadband Infrastructure
Network

BTS 5G NSA

Mobile Broadband Infrastructure
Network

Passive Infrastructure



Physical Infrastructure (*e.g., Multi Utility Tunnel; Pole*)

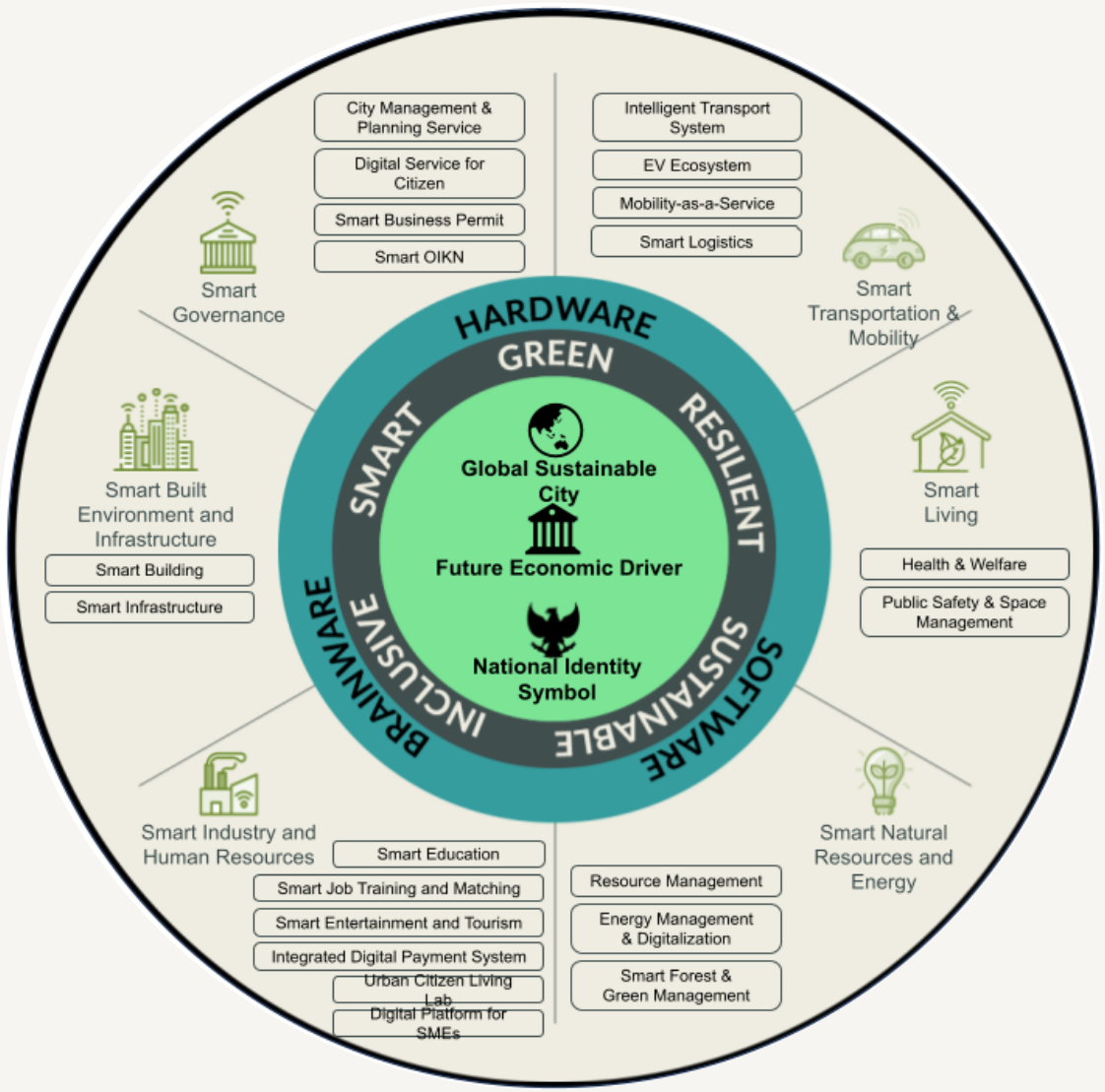
Nusantara Smart City

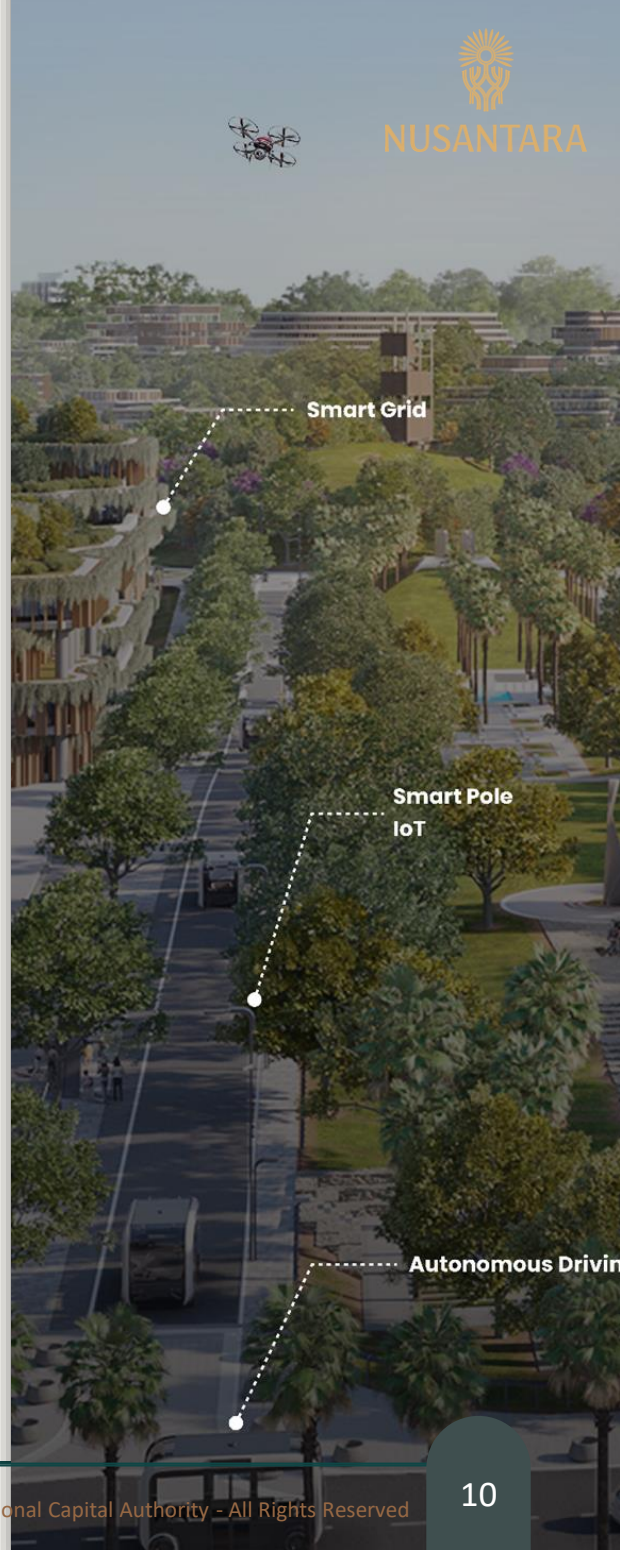
A dynamic and inclusive city, resilient in facing future challenges, and embracing technological advancement to improve productivity and quality of life

6 domain

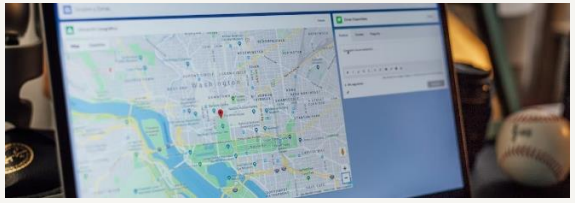
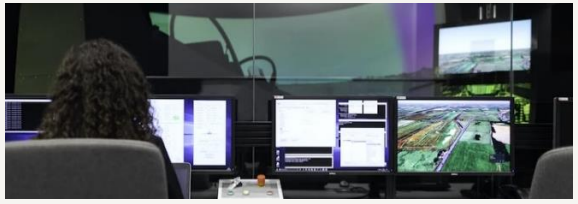
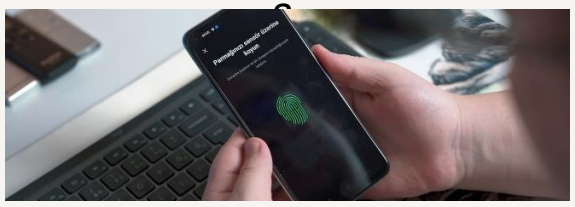
21 Sub domains

67 Smart features





1 Smart Governance

Digital Identification	Data Exchange Layer	Application's Layer
		
Civil Registers	*GIS-based Control*	*Smart Permit*
		
Secure ID Documents and Reader	*City Integrated Operation Center*	*Smart Administration*
		
Digital Identities	*Centralized Citizen Reporting System*	*E-Procurement*

2 Smart Transportation & Mobility

2.1 Intelligent Transport System

Advanced Traffic and Parking Management System

Advanced Public Transportation System

Autonomous Driving System

Incident Management System

Commercial Vehicle Operation System

Electronic Payment System

Advanced Traveller Information System

2.2 Mobility-as-a-Service

Urban Air Mobility

2.3 *Electric Vehicle Ecosystem*

2 Smart Transportation & Mobility

2.4 Smart Logistics

Smart Delivery

Autonomous Mobile Robots (AMRs)

Smart Labels

Smart Warehouse

IoT System in Logistics

AI-enhanced Supply Chain Analytics

Logistic Tracking System

3 Smart Living

Pollution Sensors

Pollution Monitoring

Live Report

Hologram Meeting

Emergency Response

Integrated Health Dashboard

Pollution Control System

- Air Pollution Monitoring
- Air Pollution Controlling

Public Space and Safety System

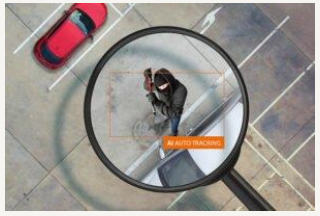
- Crisis Management
- Urban Safety and Mobility
- Disaster Prediction
- Public Wifi
- Environmental Sensors
- Interactive Displays

Health and Welfare System

- Telemedicine
- Emergency Response
- Smart Healthcare
- Smart Working

Disaster Response and Management

- Integrated Command center
- Weather Info and Alert Based on Rainfall Data



Suspect Detection

Crowd Management

Fiber Optic and *Wifi*

Integrated Command and Control Center

Live Density Report

Environmental Display

4 Smart Natural Resource and Energy

4.1 Resource Management

4.1.1 Smart Water Management

- Smart Metering
- Water SCADA
- Smart Water Quality Monitoring

4.1.2 Smart Waste Management

- Smart Bin
- Smart Waste Fleet
- Reduce, Reuse, Recycle Material Recovery Facility (3R MRF)

4.1.3 Smart Wastewater Management

- Smart Rain & Storm Water Management
- River Pollution Monitoring
- Greywater Recycling
- Water SCADA

4.2 Energy Management & Digitalization

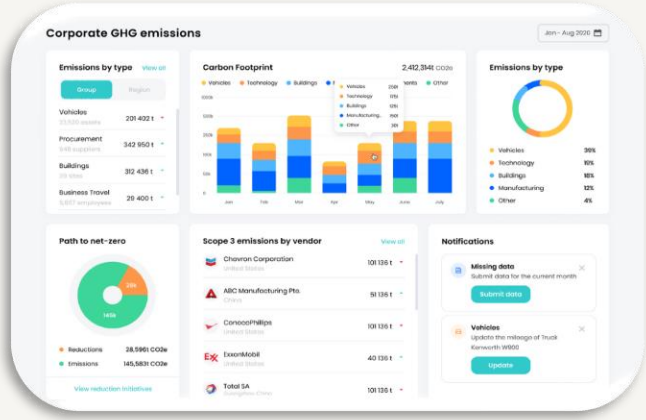
- 4.2.1 Smart Grid
- 4.2.2 Smart Energy Market
- 4.2.3 Vehicle to X Ecosystem
- 4.2.4 Storage System

4 Smart Natural Resource and Energy

4.3 Smart Forest and Green Management

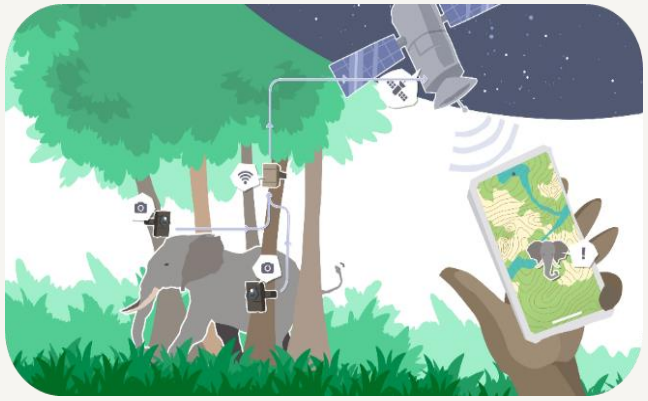
4.3.1 Carbon Stock and Emissions Monitoring

- Carbon Monitoring
- Carbon Emissions Calculator



4.3.2 Smart Forest Biodiversity Monitoring

- IoT sensor
- Trap Camera
- Dashboard Database



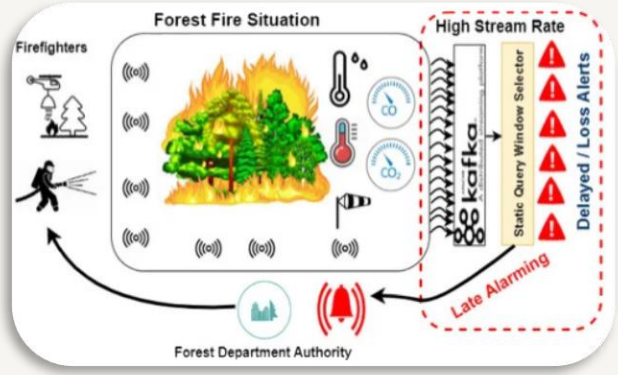
4.3.3 Precision Farming

- Data analytics capabilities
- Location optimization for crops farmers
- Automated fertilizer & water
- Remote monitoring & control
- Smart feeding management
- Disease detection & prevention

Sahal *et al*, 2021

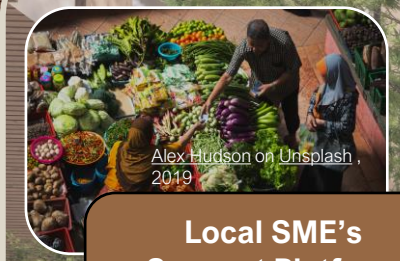
4.3.4 Smart Forest Fire Management

- Forest fire hotspot monitoring
- Forest fire emergency alert system
- Forest fire tracking capability



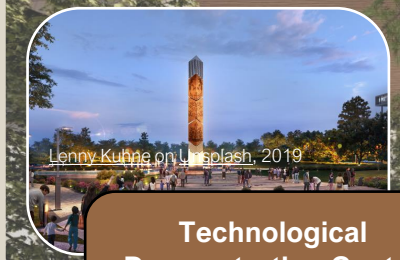
5 Smart Industries and Human Resources

Industries



Local SME's Support Platform

Urban Citizen Living Lab



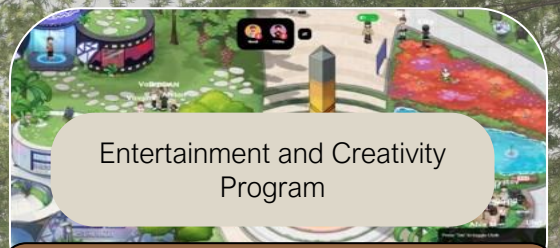
Technological Demonstration Center

Chemical & Pharmacy Center

Equipment & Machinery Center

Smart Tourism

Human Resources

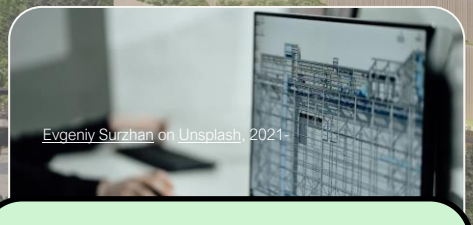


Digital Social Platform

Smart Education

Citizen Service Collaboration

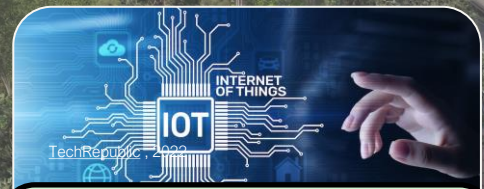
6 Smart Built Environment & Infrastructure



Smart Construction

GIS-Based Monitoring

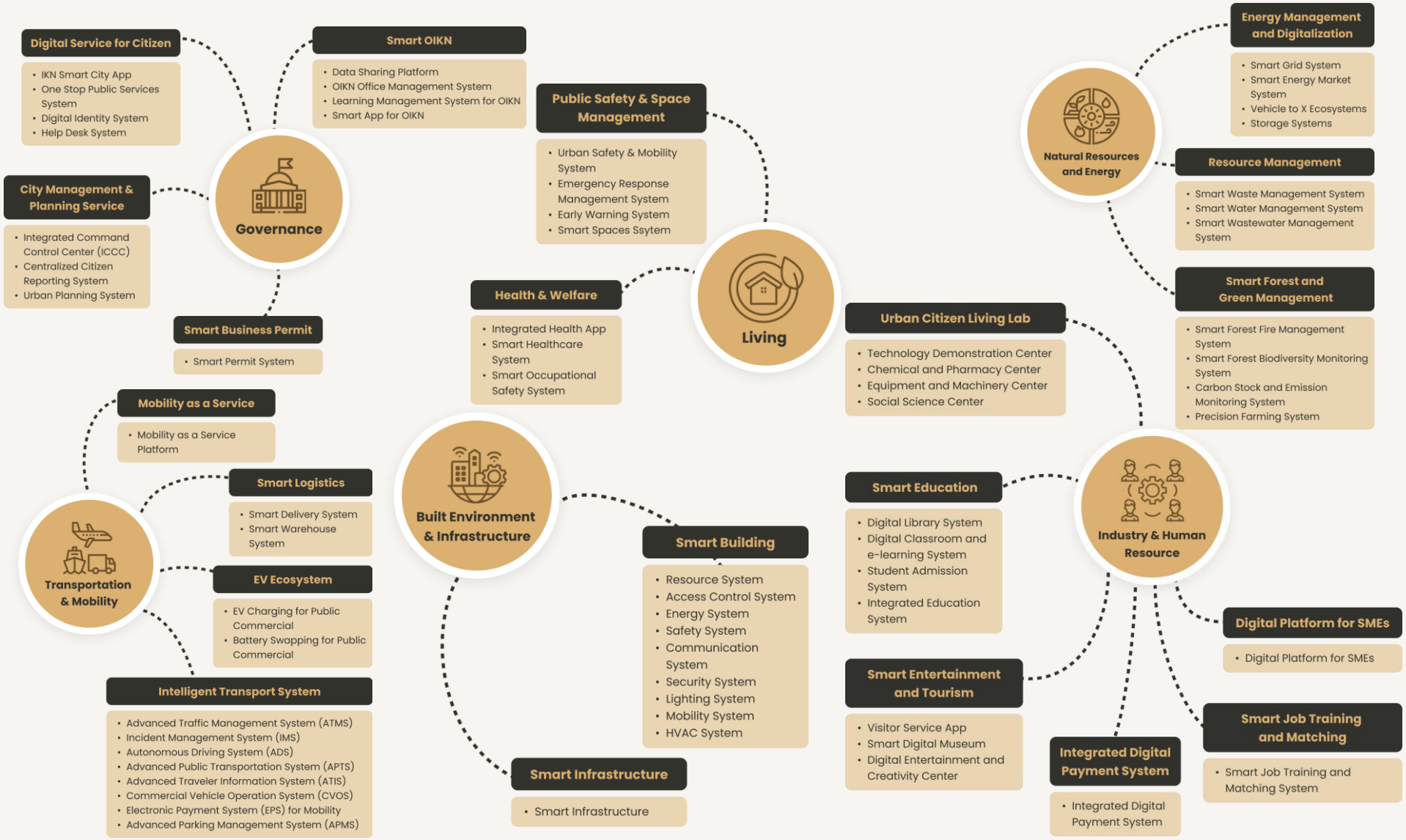
Building Automation and Management System



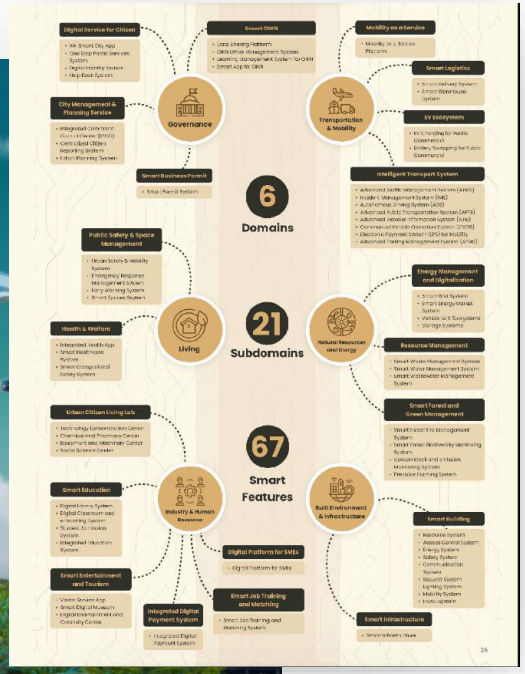
IoT-sensing in Monitoring

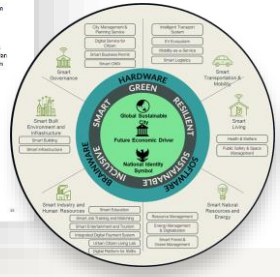
Digital Twin

67 Smart Features of Nusantara



Nusantara Smart City Blueprint





The smart city blueprint document for the capital city of the Nusantara has a goal that embraces all stakeholders in the city development and development process, namely, to achieve a balance between economic growth, environmental sustainability and community welfare.

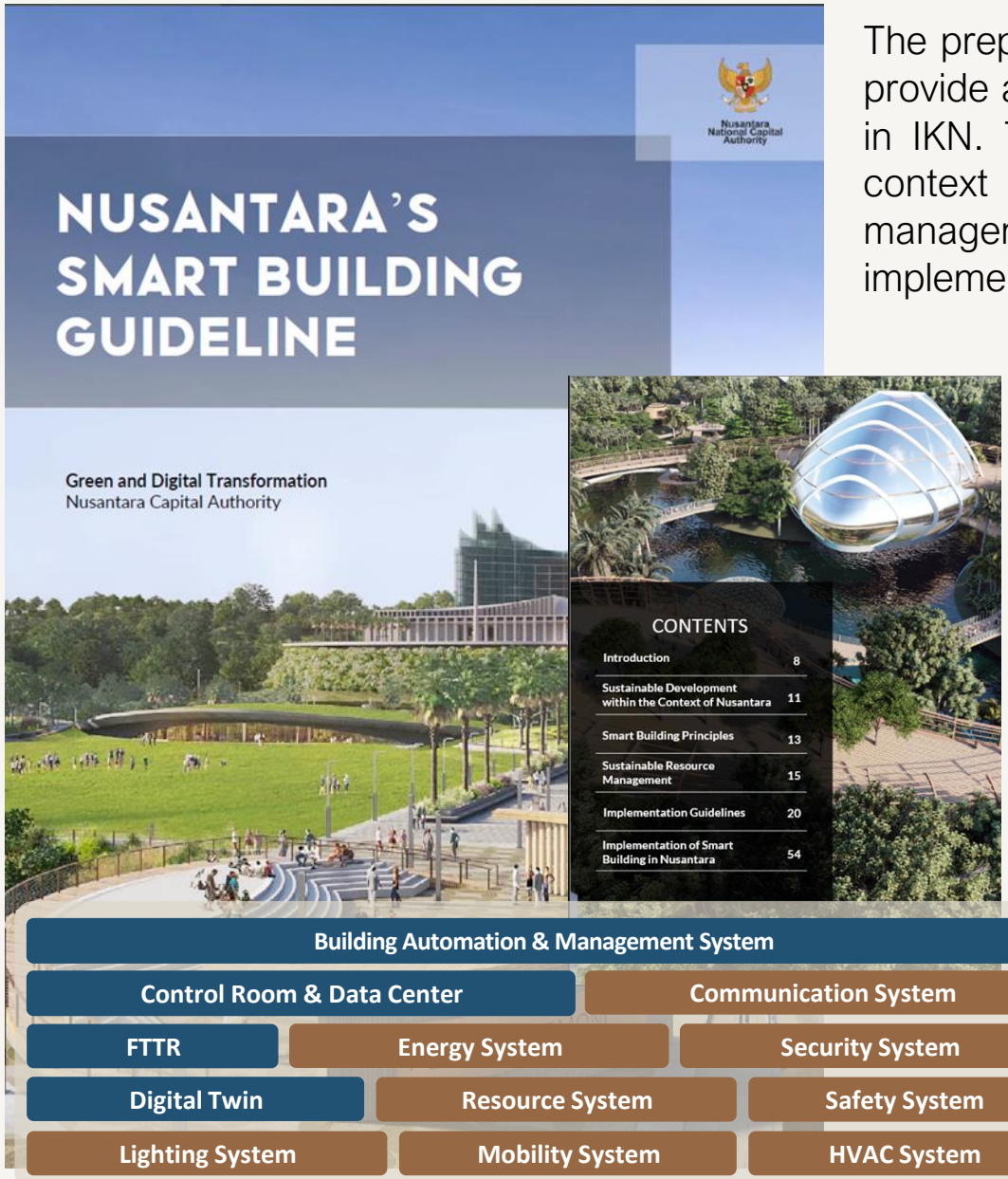
The smart city blueprint provides clear strategic guidance to the government, private sector and society in designing, implementing and maintaining smart city infrastructure to create an inclusive and participatory environment.

In terms of technological infrastructure, this blueprint also aims to serve as a guideline in designing the use and development of smart city technology to optimize the provision of public services, as well as strengthen cyber security, protect data and smart city systems from potential threats.

SE-014-Kepala Otorita IKN/XII/2023

ikn.go.id/CetakBiruKotaCerdasNusantara

Smart Building Guideline



The preparation of the Smart Building Guidelines document aims to provide a reference standard for the development of smart buildings in IKN. This document discusses sustainable development in the context of the archipelago, Smart Building principles, sustainable management of resources (energy, water and air), as well as implementation guidelines in the capital city of the archipelago.

Fitur	Klasifikasi Non-BGN									
	1	2	3	4	5	6	7	8	9	10
Sistem Manajemen Gedung Terpadu	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ruang Kontrol dan Pusat Data				✓	✓			+	+	
Fiber-to-the-Room (FTTR)	✓	✓	✓	✓	✓	✓	✓	✓	✓	+
Digital Twin				✓	✓			+	+	
Kontrol Akses Tanpa Sentuh	+	+	+	✓	✓			✓	✓	+
Manajemen Pengunjung			+	+	+			+	✓	+
Sistem Interkom	+	+	+	✓	✓			+	✓	+
Papan (*Signage*) Digital & Audio Visual				+	+	+		+	✓	
Pembaca Meter Otomatis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pembaca Sub-Meter Otomatis	+	+	+	+	+	+		+	+	
Penyeimbang Beban Listrik	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stasiun Pengisian Kendaraan Listrik Umum				✓	✓		+		✓	+
Sistem Tanggap Bencana Aktif	+	+	+	✓	✓	+	+	✓	✓	+
Sistem Pemadam Kebakaran Cerdas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tombol Darurat	+	+	+	✓	✓	✓	+	✓	✓	+
Pemeliharaan Perangkat Keselamatan Kebakaran				+	+			+	+	
Perlindungan Bahaya Hewan	+	+	+	+	+	+			+	
Pemantauan Kualitas Udara Dalam dan Luar Ruangan	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Sistem Pendingin Udara	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Pemurnian Udara dan Pemantauan Filter	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Ventilasi Berbasis Permintaan (DCV)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Sistem Deteksi iklim	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Sistem Pencahayaan Cerdas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Eskalator dan/atau *Autowalk* Cerdas				✓	✓				+	
Elevator Cerdas				✓	✓				✓	
Sistem Parkir Cerdas				+	+		+		+	+
Pengawasan Video Cerdas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sistem Penguncian Cerdas	✓	✓	✓	✓	✓	✓		✓	✓	+
Gerbang Virtual				+	+				+	
Pemantauan Hunian	+	+	+	✓	✓	+	+	+	✓	+
Pengelolaan Air Cerdas	✓	✓	✓	✓	✓	✓	+	✓	✓	+
Dispenser Air Minum Cerdas				+	+				+	
Saluran Limbah Cerdas				+	+				+	
Tempat Sampah Cerdas	+	+	+	+	+	+	+	+	✓	+
Toilet Cerdas				+	+				+	

Tabel 5. Matriks Fitur Bangunan Cerdas Berdasarkan Klasifikasi BGN

Fitur	Klasifikasi BGN		
	Sederhana	Tidak Sederhana	Khusus
Sistem Manajemen Gedung Terpadu	✓	✓	✓
Ruang Kontrol dan Pusat Data		✓	✓
Fiber-to-the-Room (FTTR)	✓	✓	✓
Digital Twin		✓	✓
Kontrol Akses Tanpa Sentuh	+	✓	✓
Manajemen Pengunjung		+	✓
Sistem Interkom	+	✓	✓
Papan (*Signage*) Digital & Audio Visual		+	✓
Pembaca Meter Otomatis	✓	✓	✓
Pembaca Sub-Meter Otomatis	+	+	+
Penyeimbang Beban Listrik	✓	✓	✓
Stasiun Pengisian Kendaraan Listrik Umum		✓	✓
Sistem Tanggap Bencana Aktif	+	✓	✓
Sistem Pemadam Kebakaran Cerdas	✓	✓	✓
Tombol Darurat	+	✓	✓
Pemeliharaan Perangkat Keselamatan Kebakaran		+	+
Perlindungan Bahaya Hewan	+	+	+
Pemantauan Kualitas Udara Dalam dan Luar Ruangan	✓	✓	✓
Sistem Pendingin Udara	✓	✓	✓
Pemurnian Udara dan Pemantauan Filter	✓	✓	✓
Ventilasi Berbasis Permintaan (DCV)	✓	✓	✓
Sistem Deteksi iklim	✓	✓	✓
Sistem Pencahayaan Cerdas	✓	✓	✓
Eskalator dan/atau *Autowalk* Cerdas		✓	+
Elevator Cerdas		✓	✓
Sistem Parkir Cerdas		+	+
Pengawasan Video Cerdas	✓	✓	✓
Sistem Penguncian Cerdas	✓	✓	✓
Gerbang Virtual		+	+
Pemantauan Hunian	+	✓	✓
Pengelolaan Air Cerdas	✓	✓	✓
Dispenser Air Minum Cerdas		+	+
Saluran Limbah Cerdas		+	✓
Tempat Sampah Cerdas	+	+	✓
Toilet Cerdas		+	+

Features matrix according to Building Classification of BGN[1] dan Non-BGN

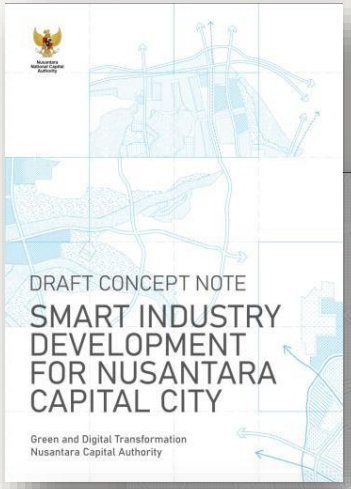
ikn.go.id/BangunanCerdas

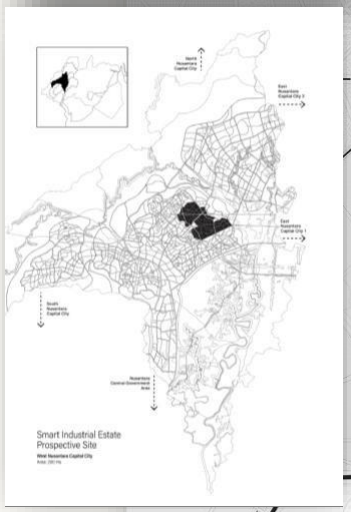
[1] *Bangunan Gedung Negara* / State Building

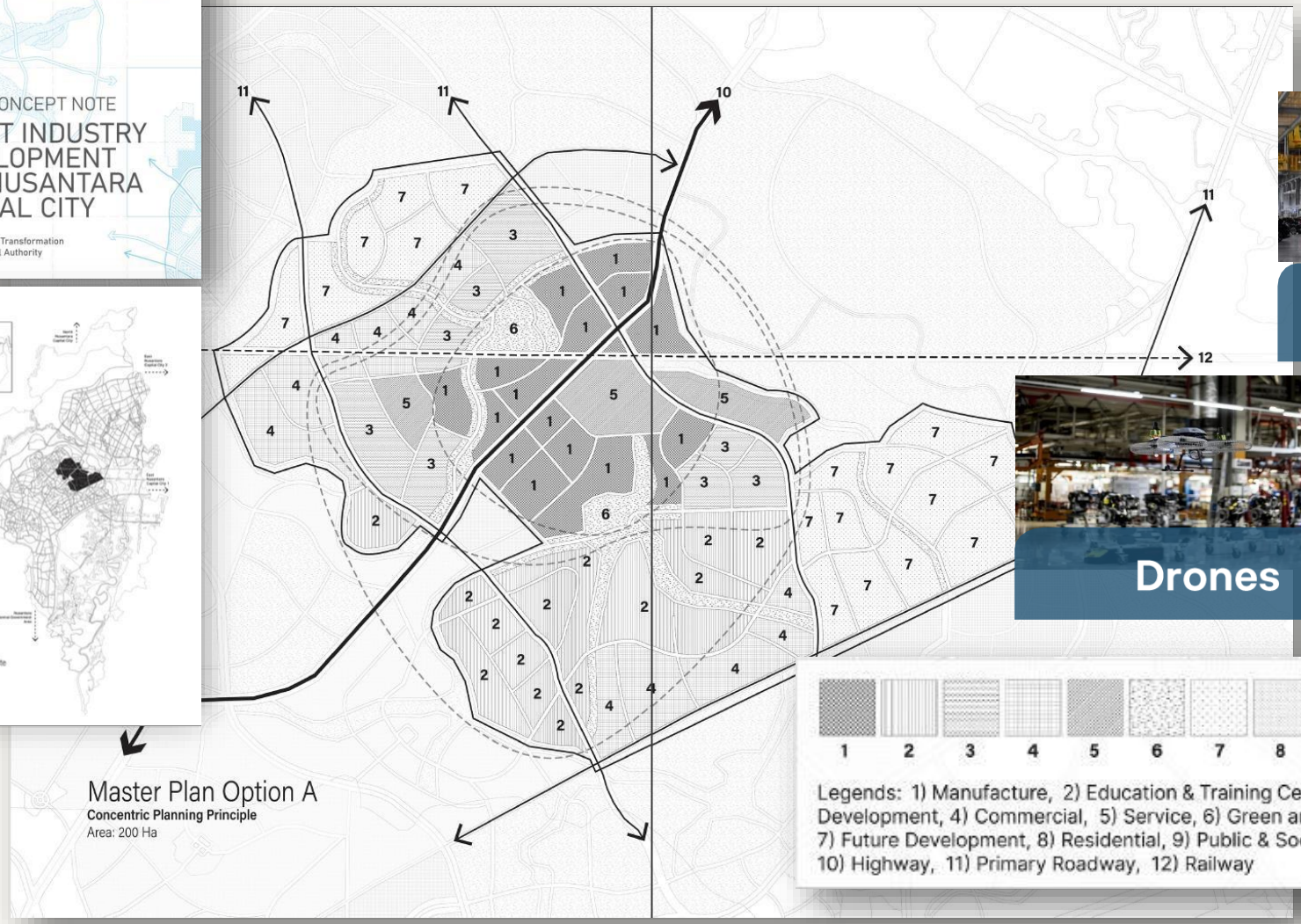
- Building Automation & Management System
- Control Room & Data Center
- Communication System
- FTTR
- Energy System
- Security System
- Digital Twin
- Resource System
- Safety System
- Lighting System
- Mobility System
- HVAC System

Smart Industries Development

Five recommendations for main technology-based industrial clusters that support sustainability with three regional development models based in West IKN

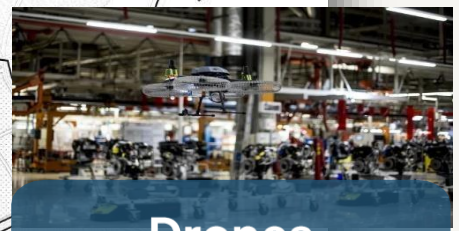






Electric Vehicle

Pharmaceutical



Drones

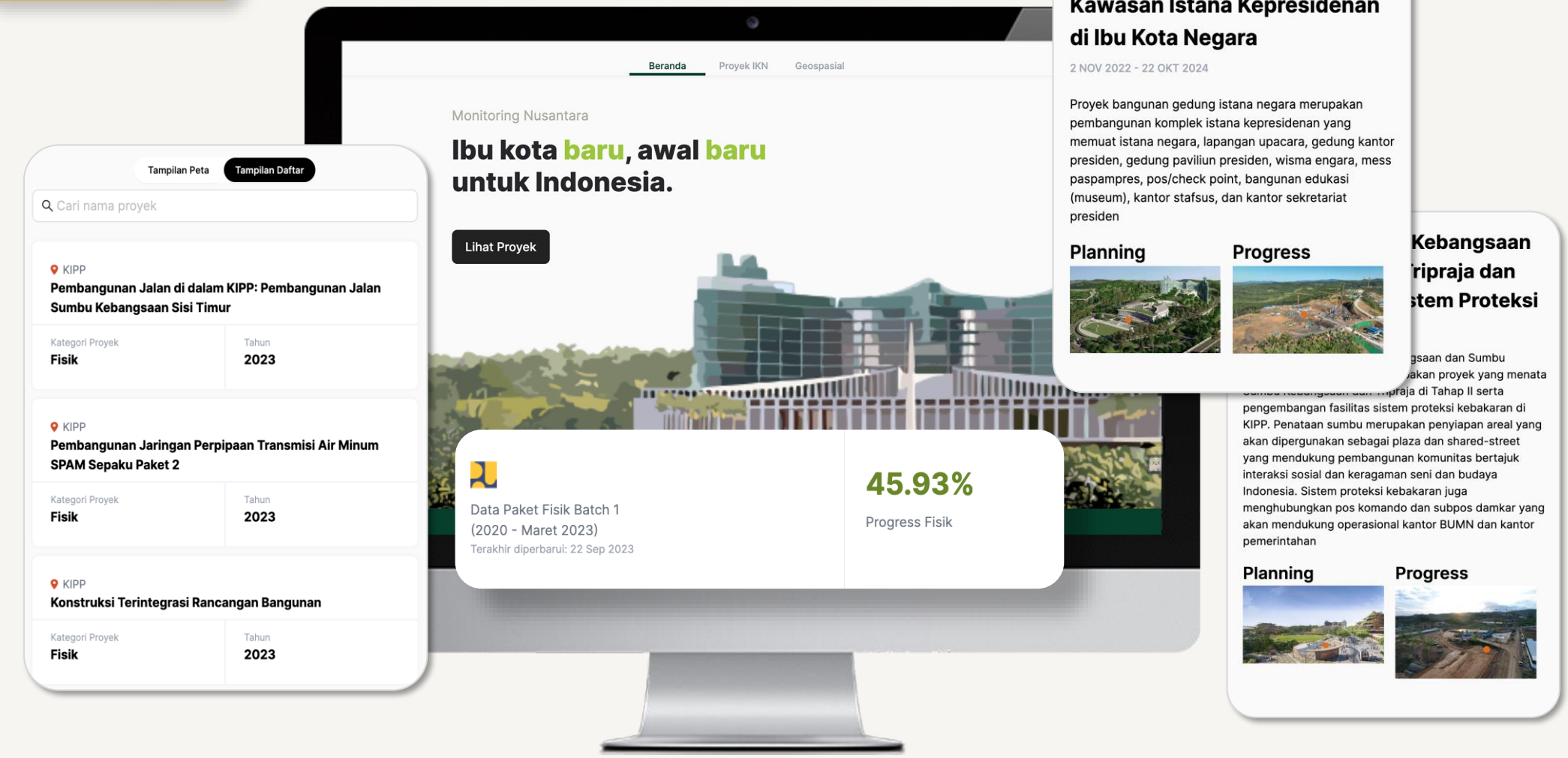
Semiconductors

Solar Modules

Progress Monitoring Platform for IKN Development

Montara – Monitoring Nunsatara

montara.ikn.go.id



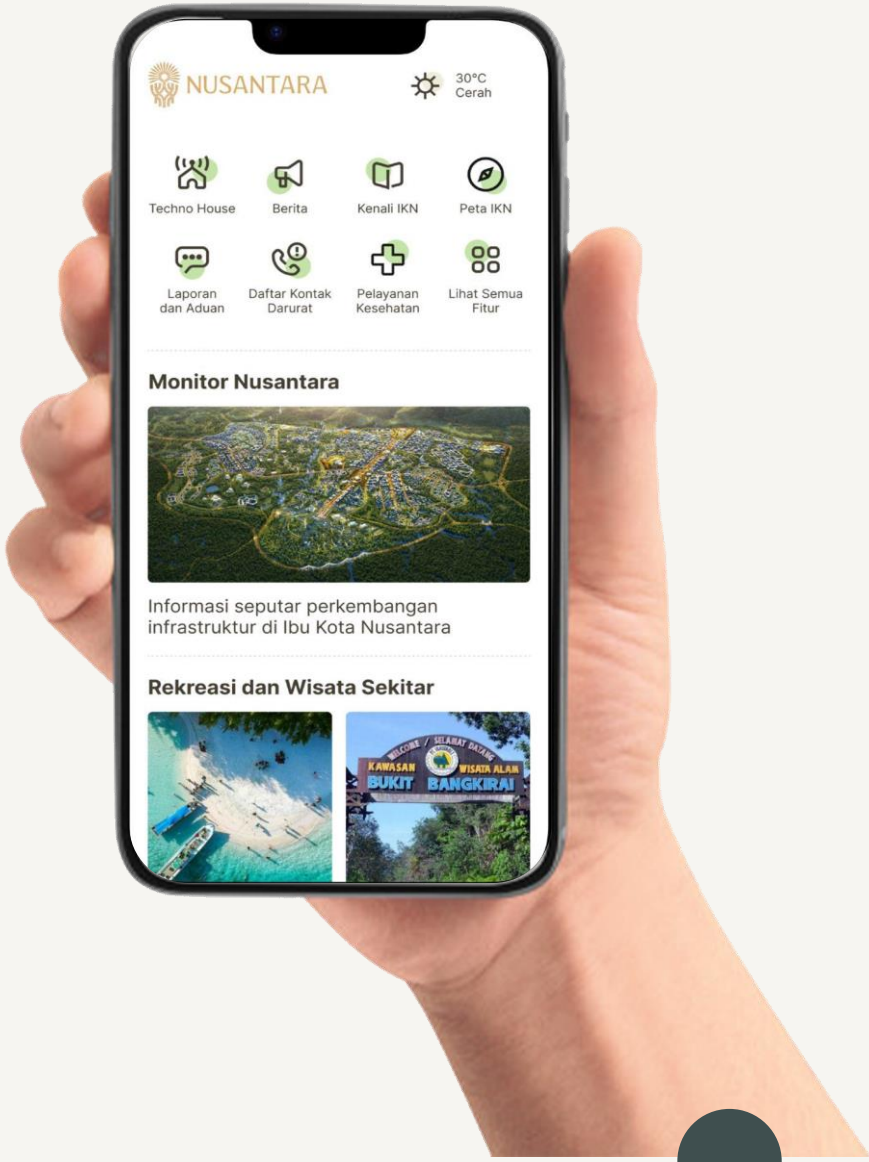
IKNOW SuperApps

The IKN application is designed to support the vision of the Indonesian capital as a modern and efficient urban center.

With a variety of features and services, the IKN Application is present as a one-stop-solution aimed at improving the quality of life for the Indonesian Smart City persona

- Latest News
- Tourist Object
- Health Facility
- Laporan & Aduan
- Project Monitoring
- Techno House Reservation
- Article and Press Release
- Nusantara Map Exploration
- Latest Collaboration IKN

Available in Google Play Store and Apple Store

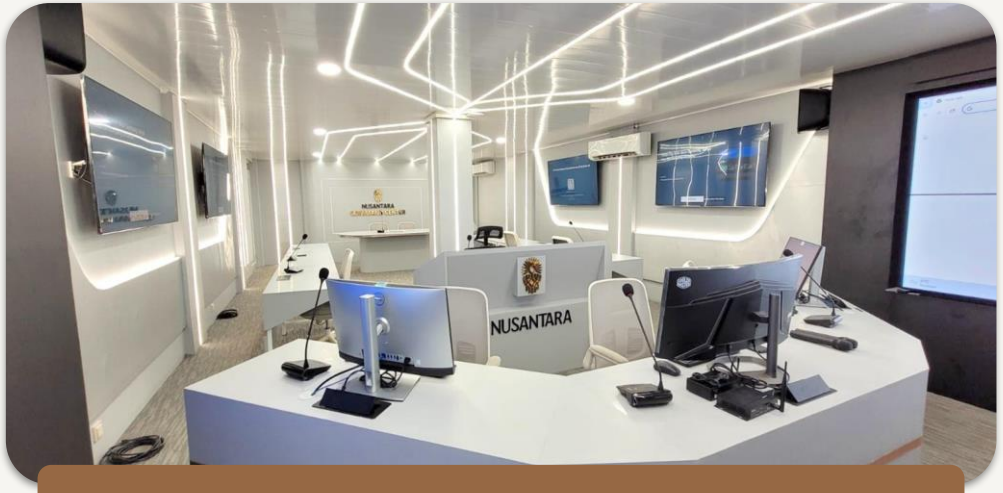


Smart City Product

Nusantara Command Center

Phase 1

Indonesia's President Joko Widodo visiting the Nusantara Command Center



Control Station Nusantara Command Center

Main Monitor on project progress development of Nusantara

- Data Rencana Pembangunan
- Data Spasial
- Data Status Pembangunan
- Data Investasi
- Data CCTV
- Data Pelaporan /Media Sosial

Capaian Pembangunan | Pemantauan Visual | Analisa Data | Komando

Nusantara Community Development

Nusantara Technology House: A Glimpse of Future Living

As an embodiment of the Nusantara Smart City master plan, the Technology House facility is an **educational destination** for the exhibition of the Nusantara Capital city concept exhibition and a **showcase for various technologies** that can be implemented into the Nusantara Smart City Blueprint.

Nusantara Community Development

Reskilling and Upskilling Program

Digital Skill Training

Computer skills training in Desa Bukit Raya, kab. Penajam Paser Utara

"*Coding Mom*" Program

Training Program for digital literacy, website design & development, and digital marketing

Digital Literacy and Information Technology Training

Developing the Capital of the Nusantara as a **Smart City** with the active role of **local communities** in the **digital ecosystem**

Solar Mom Workshop

Empowering program for housewives in **making and utilizing** solar-powered lamp for SMEs

Podcast Training

Publication and communication training in Desa Bukit Raya

Partnership with Knowledge Partner

30+ Local Instituion

10+ International Institution

Stanford | Doerr School of Sustainability

King's College London

TU Delft

Universiteit Leiden

Northern Illinois University

University of Turku

University of Malaya

40+ Global Industry

LG CNS

Microsoft

Huawei

Siemens

Cisco

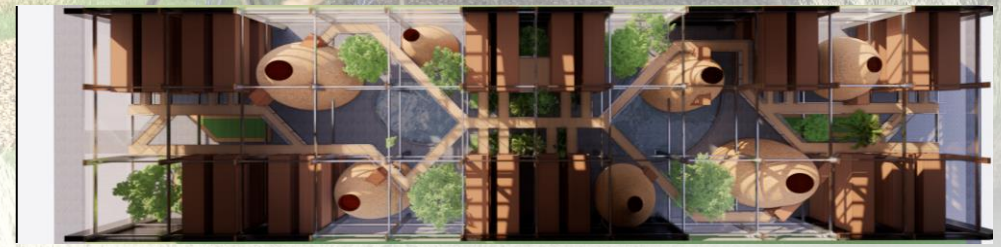
Honeywell

Hyundai

SCIC

Nusantara Knowledge Hub

K-HUB



Nusantara Investment Priority

Focus of investment briefs (KIPP 1A, 2024)

Data Center

Command Center

Smart Pole

EV Charger

Smart City Packages

Autonomous Minibus

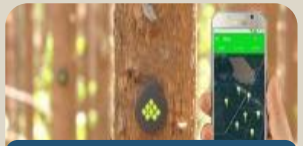
Electronic Payment System

Smart Waste Management

Digital Library

Urban Air Mobility

Smart Water Management



Smart Forest Management

Smart Grid

12 Fundamental Sectors

Renewable Energy

Telecommunications Network

Transportation

Housing

Water Treatment

Waste Management

Technology Infrastructure

Commercial Infrastructure

Medical Facilities

Social & Public Facilities

Education Facilities

Green Industrial Zone

Investment Snapshot

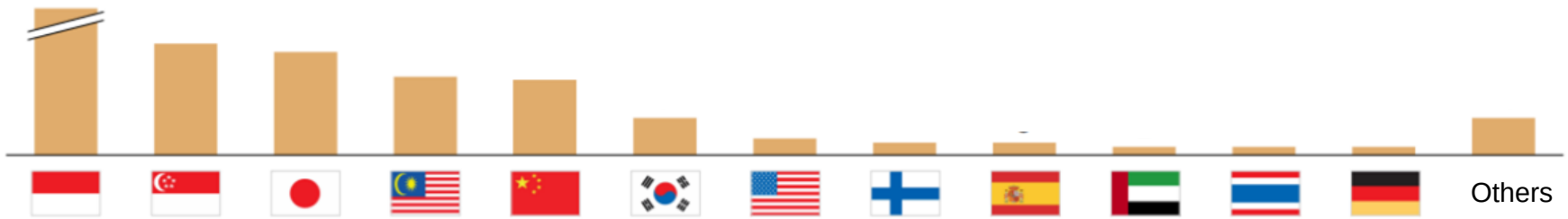
May 2024

409
Letters of intent

>21
Countries

70	Property	64	goods and services
18	Water	20	Education
19	Health	31	Technology
16	Mixed-used	18	Office
13	Finance	8	Industry
6	Township	3	Telecommunication
67	Energy	17	Lifestyle
6	Transportation	8	Construction
15	Waste	1	Consultancy

Distribution of Countries



Infrastructure Development Progress

Presidential Palace

West National Axis *(Sumbu Kebangsaan Barat)*

Multi-utility tunnels

Workers' Housing Compounds

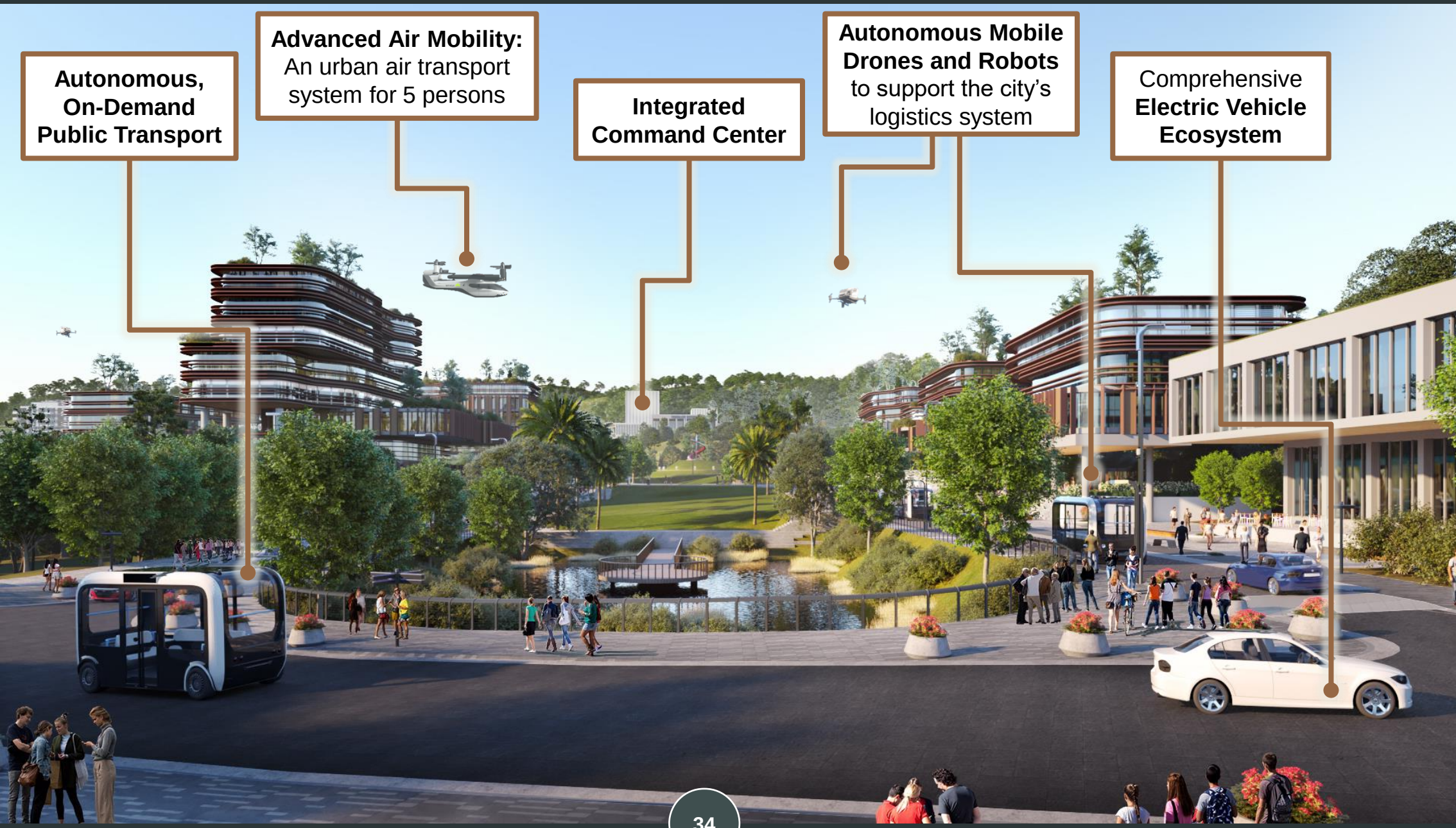
Dam to supply Nusantara's raw water

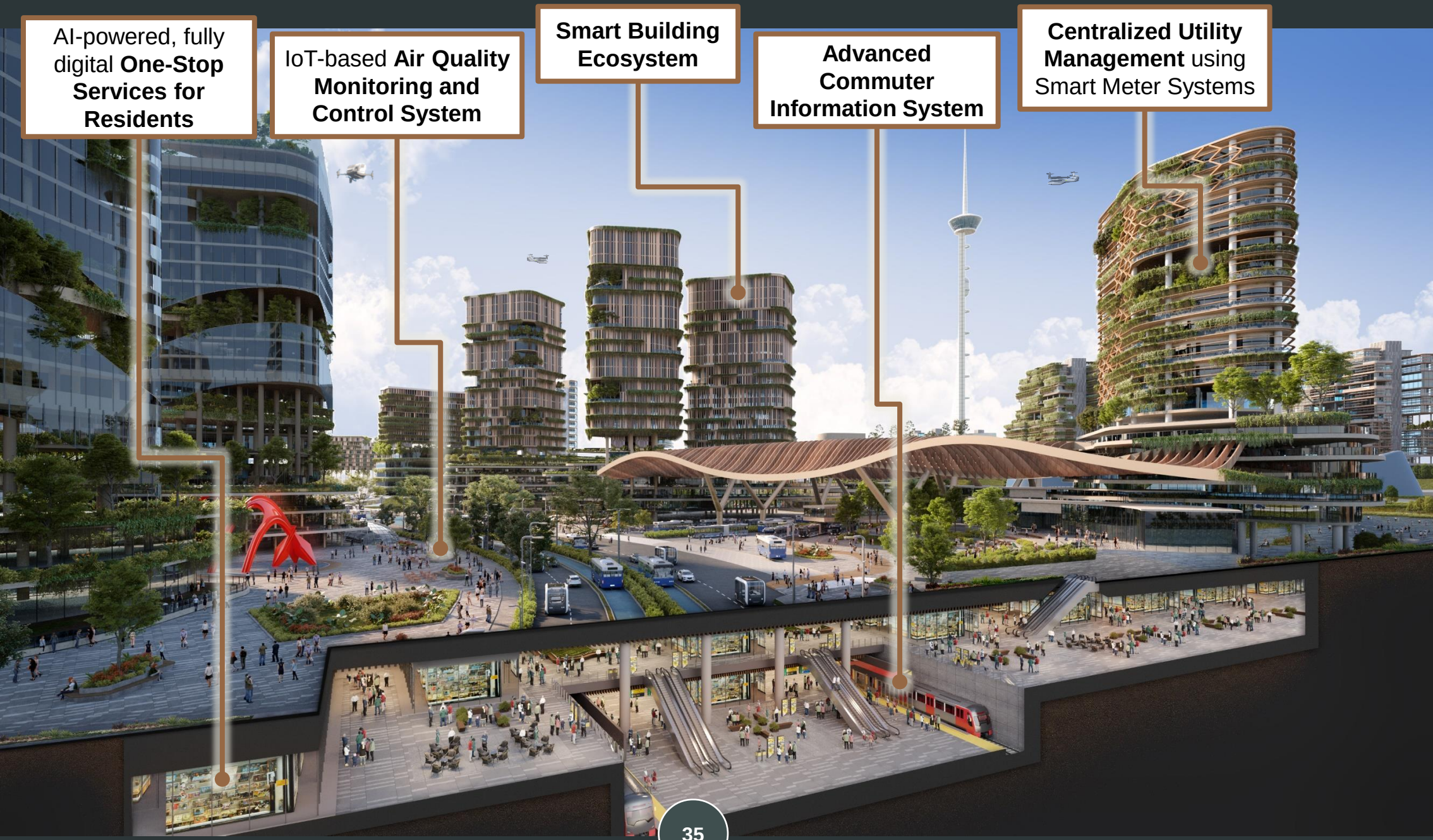
Plant nurseries

Water intake and piping system

Hotel (by private sector)

Imagining Nusantara in 2045




AI-powered, fully digital **One-Stop Services for Residents**
IoT-based **Air Quality Monitoring and Control System**
Smart Building Ecosystem
Advanced Commuter Information System
Centralized Utility Management using Smart Meter Systems

Nusantara Capital City Authority – Jakarta Office
Menara Mandiri Tower II, 5th Floor
Jl. Jend. Sudirman Kav 54-55, RT.5/RW.3, Senayan,
Kebayoran Baru, Jakarta Selatan 12190, Indonesia

Nusantara Capital City Authority – Balikpapan Office
Pantai Mentari Compound
Jl. Mulawarman 6, Manggar, Kec. Balikpapan Timur
Kota Balikpapan 76116, Kalimantan Timur

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Profile

Prof. Mohammed Ali Berawi, M.Eng.Sc., Ph.D

Prof. Mohammed Ali Berawi, M.Eng.Sc, Ph.D currently serves as Deputy for Green and Digital Transformation of the Nusantara Capital Authority of Indonesia. Prof. Ali Berawi previously served as Member Secretary of the Republic of Indonesia's Presidential Advisory Council (2020 – 2022).

Prof. Mohammed Ali Berawi is a professor at the Faculty of Engineering, University of Indonesia, a Visiting Scholar at the Department of Civil Engineering and Environment, University of Washington, United States (2017), Visiting Professor at University of Malaya, Malaysia (2023) and since 2019 became a Professor at the Graduate School of Industrial Economics, Peter the Great Saint Petersburg Polytechnic University, Russia. Prof. Ali Berawi is listed in the Top 2% of the World's Best Scientists by Elsevier and Stanford University (2021 – 2023).

Prof. Ali Berawi is the Chairman of Indonesian Lecturers Association (ADI) (2022 – 2027), Director of ASEAN University Network for Sustainable City and Urban Development (AUN-SCUD) and Working Group Leader for smart cities in Association of Pacific Rim Universities (APRU-SCL).