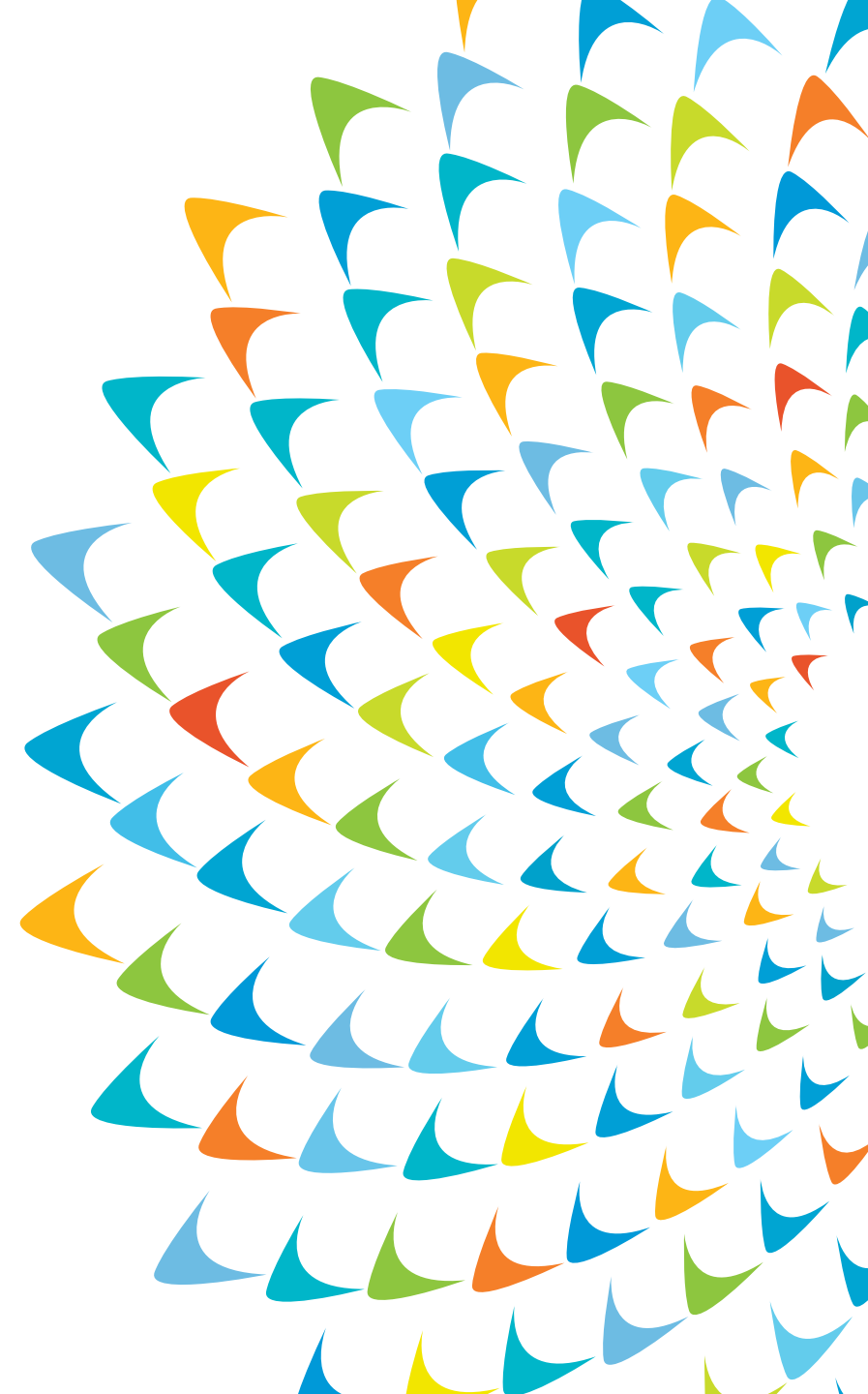


1st Asia-Pacific Housing Conference 2022
Technical Session 3
**Planning, Design and Construction of Resilient
Housing Projects**

Ulaanbaatar Green Affordable Housing and Resilient
Urban Renewal Sector Project

Arnaud Heckmann
Principal Portfolio Management Specialist
Asian Development Bank
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Ulaanbaatar Sub-standard Peri-Urban Areas

Ulaanbaatar: 1.4 million population (Mongolia: 3 million)

Ger areas: 840,000 population; 60% of the City; 30% of the country

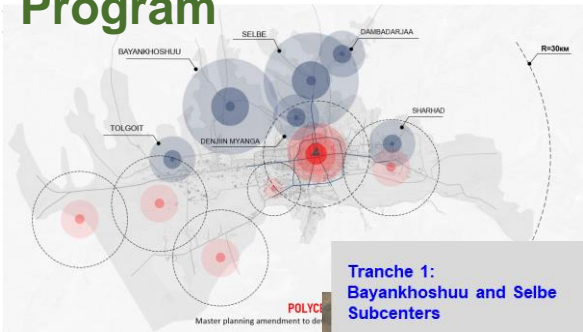
- Open pit latrines system leading to severe soil pollution especially when temperature rises
- Limited access to water, supplied by water kiosks
- Poor drainage, absence of green buffer zone, and dirt roads exacerbating flood events in summer
- Lack of public space; sport, cultural, education and health facilities; and business opportunities
- No heating network, inefficient individual stove burning low quality coal, and low energy efficient shelters cause vulnerability to low temperatures and high emission and extreme air pollution in winter

▶ **Continue to grow (migration + natural growth) due to lack of sustainable strategy, infrastructure, and affordable alternative**

▶ **High vulnerability to climate change, highly emitting, highly polluting**



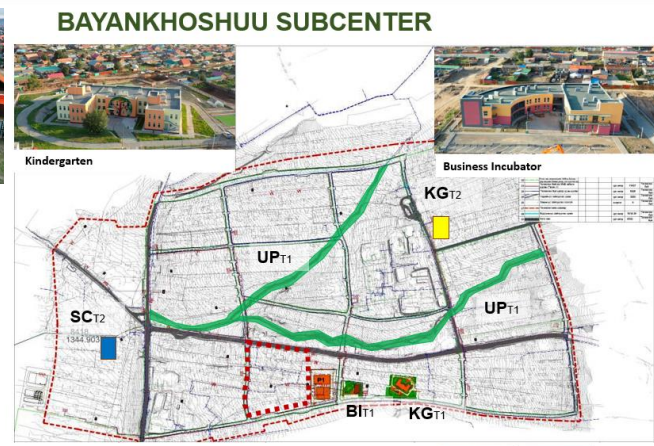
POLYCENTRIC AND DECENTRALIZED URBAN DEVELOPMENT STRATEGY - Ulaanbaatar Urban Services and Ger Areas Development Investment Program



- Tranche 1: Bayankhoshuu and Selbe Subcenters**
- Tranche 2: Denjiin and Dambadarjaa + Tranche 1 Subcenters**
- Tranche 3: Tolgoit and Sharkhad Subcenters**
- Business incubator
 - Kindergarten
 - Urban Park
 - Sport complex
 - Community center
 - Shelter for victims of domestic violence
 - Heating plant
 - Water reservoir
 - Pumping station

➡ Increase density where infrastructure are available
 Decrease density where infrastructure are lacking

1. Extension of main truck infrastructure, and basic urban and social services
2. Affordable Housing and Eco-District Solutions



Integrated Urban Infrastructure:
 Roads, water and wastewater networks, heating system, drainage, bridges, power, telecommunication, street lighting

Social Facilities:
 BI = Business Incubator
 KG = Kindergarten
 UP = Urban Park
 SC = Sport Complex

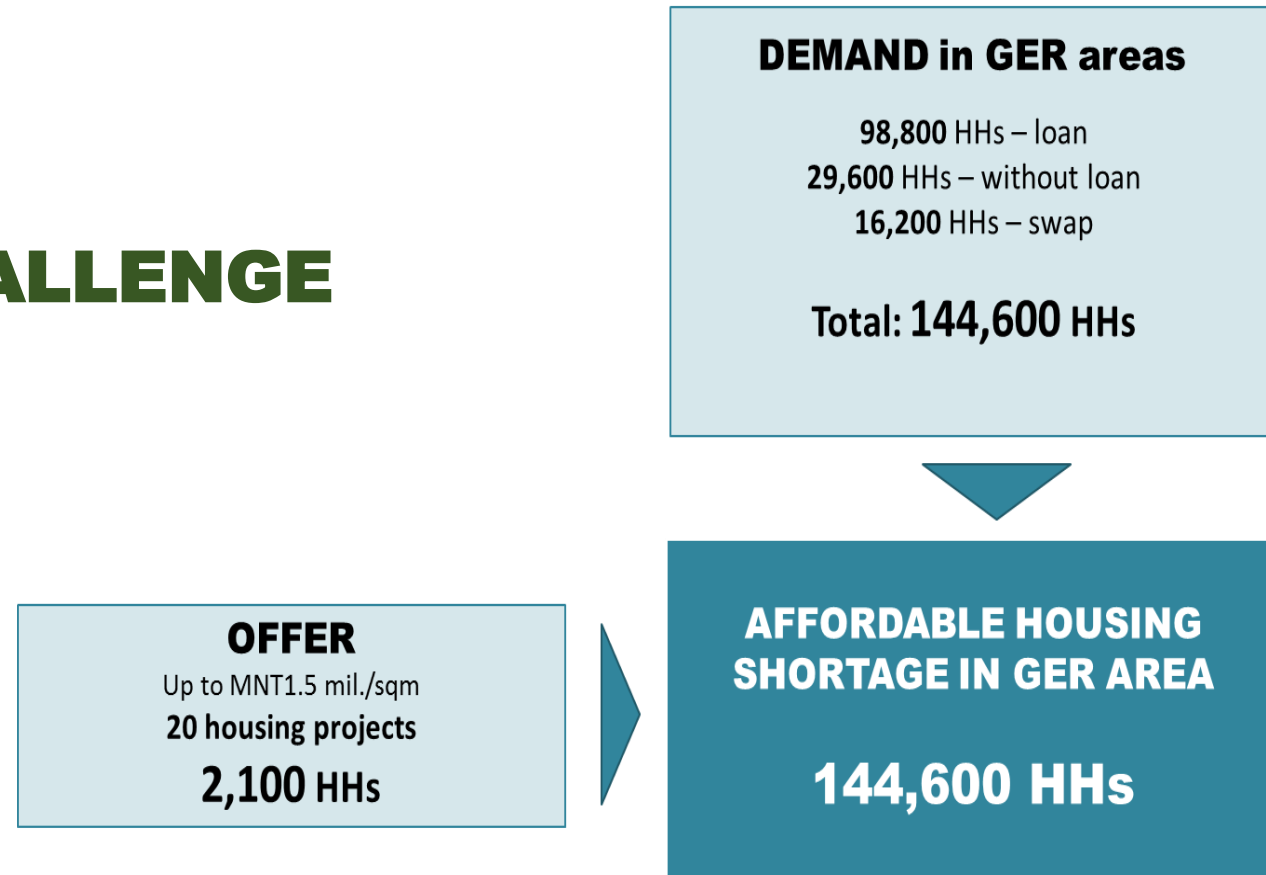
T1 = TRANCHE 1
 T2 = TRANCHE 2
 Green Affordable housing core subproject



Investment Program	\$ million
ADB	163.7
MUB	96.0
EIB	60.3
Total program	320.0

➡ Infrastructure where growth potential is high, to encourage densification, and initiate a change in the urban fabric
Compact, low carbon and resilient development
 Upgrade of 6 Subcenters as the backbone of peri-urban developments to unlock economic potential

THE HOUSING CHALLENGE



- High and Medium real-estate market saturated
- 60% of households want to buy apartments with 8% mortgage loan at MNT1.2 million/m² in average. Prefer to stay within their communities.

ECO-DISTRICT PRINCIPLES

Mixed land uses and functions

(residential, commercial and recreation functions; ample public and green space; education, cultural and health facilities; minimize needs for transportation)

Social mix (urban areas that mixed different category of population having different income level) and vibrant/engaged communities

Green and resilient using implementable renewable energy and energy efficient

▶ Attractive for communities: Quality of life, Social integration, and Affordable

▶ Attractive for real estate developers: Reasonable Net Profit Value

▶ In line with City master and local plans, and urban regulation

GREEN FEATURES

Renewable Energy

- Passive Solar Design
- PV (Photo Voltaic) Panels

Energy Efficiency

- High efficiency isolation system based on Mongolian Norm and Regulation "Thermal Performance of Buildings"

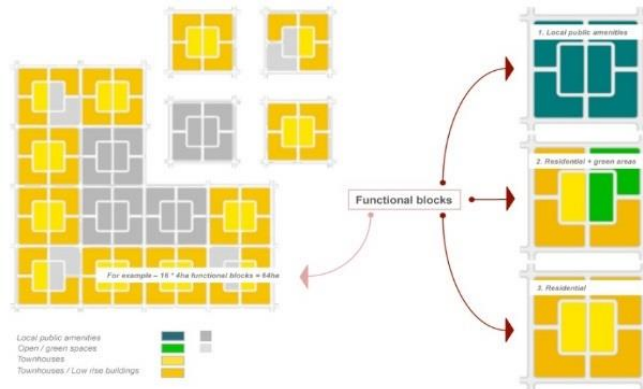
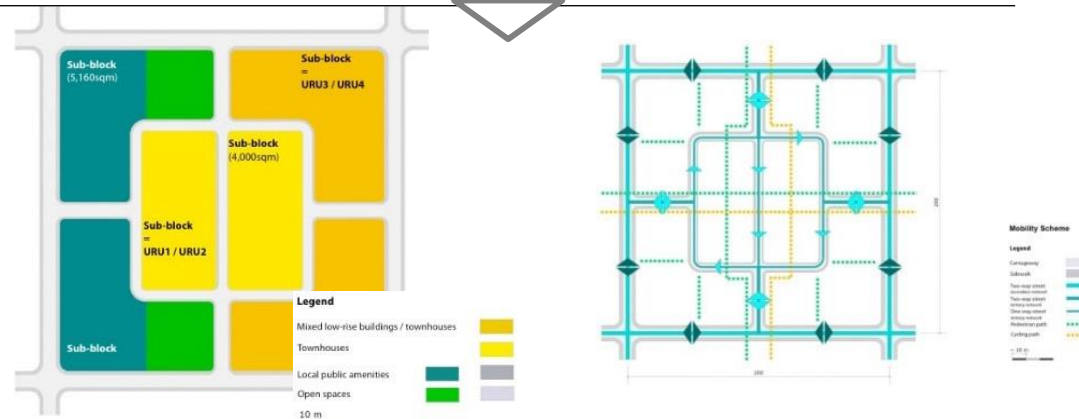
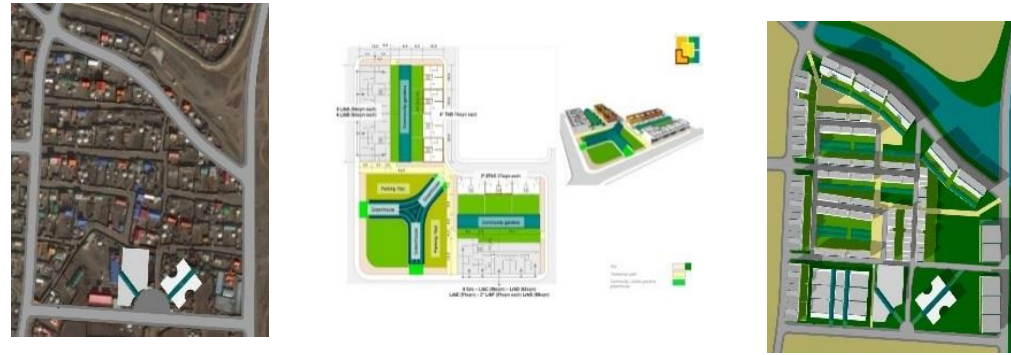
Efficient land use planning

- Compact design
- Shape and building orientation

Energy Performance Monitoring System
(green and smart)

ECO-DISTRICT / BLOC DEVELOPMENT

Integrated planning and development process, and **complete solution** at the neighborhood level to build up **citywide sustainability** and **green development**



▶ **Combination** of public policy, catalytic investments from local government and utilities, private sector and communities participation

▶ **Bridge the gap** between green policy objectives and practical investments

▶ **Appropriate scale** for step by step implementation and to enhance neighborhood urban and environmental solutions

Block



DISTRICT



City



ULAANBAATAR GREEN AFFORDABLE HOUSING AND RESILIENT URBAN RENEWAL PROJECT

Large scale demonstration project and complete solution, leveraging private sector investment, to deliver **affordable and green housing stock**, and establish policies, mechanisms, and standards for sustainable affordable housing and green urban development.



10,000 housing units (55% affordable, 15% social, and 30% market rate units) and redevelop **100 hectares** of *ger* areas into **ecodistricts** that are:

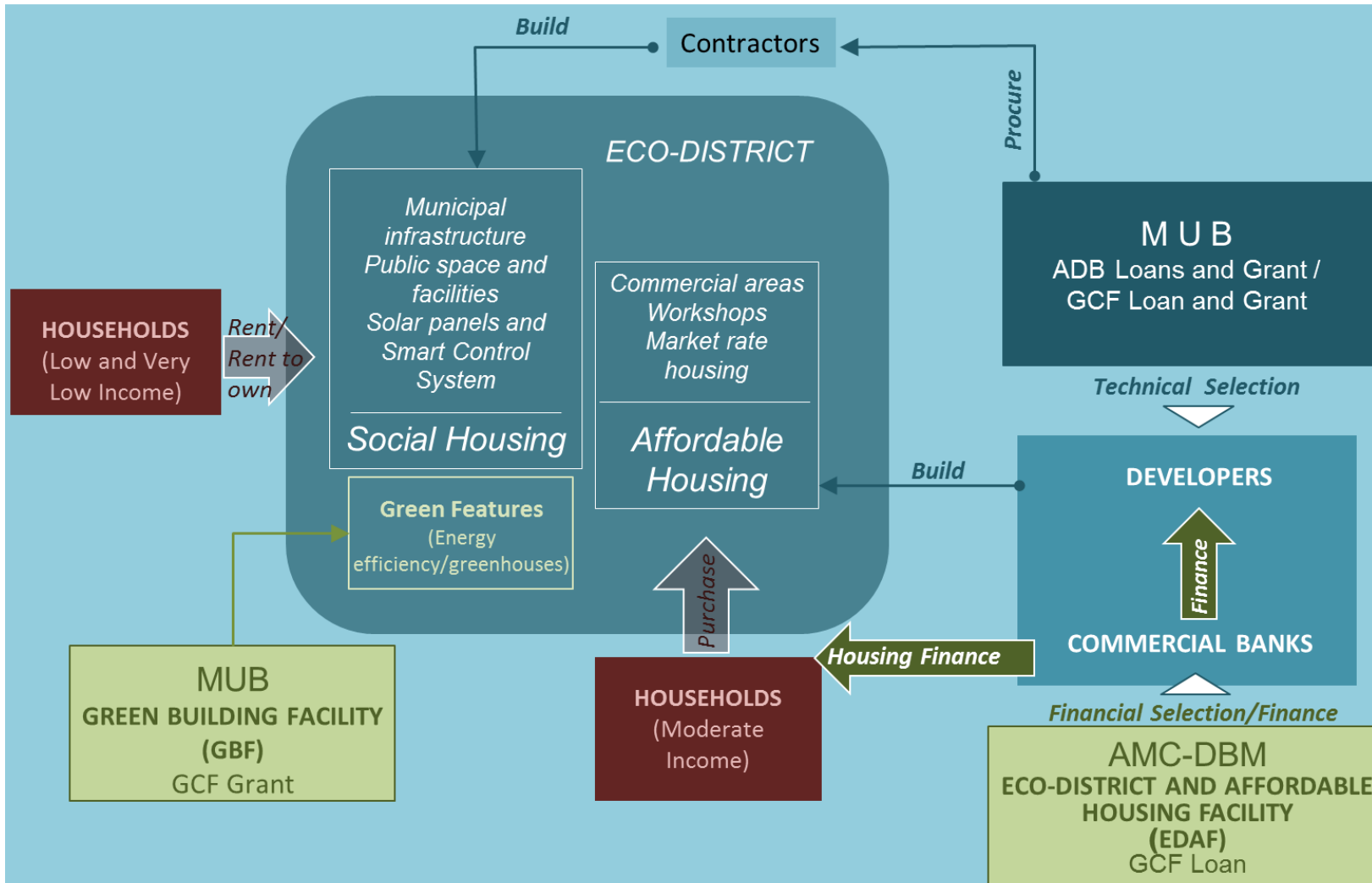
- (i) mixed-use with ample public space and public facilities,
- (ii) mixed-income with at least 65% of combined affordable and social housing units,
- And
- (iii) **Resilient, resource efficient, and maximizing the use of renewable energy**

Improve the regulatory and enforcement framework for climate responsive urban planning, green building, and affordable housing.

ECO-DISTRICT DESIGN PARAMETERS

- Housing units should comprise **15% social housing, 55% affordable housing, and 30% market rate** housing.
- **30% of land use is public space** (including 15% of open space and green areas)
- the ratio of m² of public amenities/facilities, commercial facilities, and entertainment areas per person correspond to average international standard, **respectively 1.2 m²/persons, 1.5 m²/persons, and 0.5 m²/persons.**
- The average density of an eco-district should be about **300 p/ha** and housing building should comprise townhouses or low-rise building of a maximum of five to six floors.
- Each building should reach an energy efficiency performance guaranteeing an **energy consumption of 150 kilowatt hours per m² per year**, indoor air filtration system, passive design, sensor in building, heating regulation system.
- **Universal and inclusive design, earthquake resistant.**
- Building and facilities should have **18% of their footprint covered with solar panels.**
- At least **10% of the eco-district surface should be covered with greenhouses** for urban farming (on the ground or on building or facilities rooftop).

INTEGRATED FINANCING /DESIGN /INSTITUTIONAL MECHANISM



Source	Amount (USD million)
Asian Development Bank	80.0
Green Climate Fund	145.0
GCF (grant)	50.0
GCF (concessional loan)	95.0
HLT Fund (grant)	3.0
Commercial banks/DBM	111.4
Developers	131.8
Beneficiaries	63.9
Municipality of Ulaanbaatar	35.0
Total	570.1

KEY MECHANISMS

- **Designed Based PPP (Public Private People Partnership)** to to deliver eco-district urban solution, using community consultation, financial, and institutional integrated mechanism that involve public sector, beneficiaries, commercial banks and real estate developers.
- **Financial intermediary** (financed by the Green Climate Fund) to leverage private sector resources (EDAF leveraging about \$300 million financing from commercial banks, developers and beneficiaries,).
- **Green Building facility** (financed by the Green Climate Fund): performance-based grants to qualified private developers for climate change mitigation and adaptation features such as passive housing design, extra isolation system, and heating regulation system to bring down the energy consumption.
- **Effective community participation**, through (a) community participation, social, and gender action plans including skills training and livelihood improvement opportunities; and (b) community-based urban farming and solid waste management

- **Voluntary Land Swapping Mechanism** that will provide housing solution to all residents for in situs redevelopment and through which the ger area population can move up to more climate resilient, low carbon, modern apartment buildings.
- **Renewable energy** in buildings, **Smart renewable energy and building performance control and monitoring system** (financed by HLT fund) will establish an energy performance monitoring system, install and provide initial O&M for solar PV, pilot small scale grid lithium-ion battery storage plant, and pilot private sector management contract for solar panels operation and maintenance.
- **Sector and Policy reform:** Green building standard (including eco-efficient materials, equipment, passive solar house design, renewable energy, and ventilation systems) and associated regulations, energy efficient construction material and techniques, tariff, efficient supply chains for renewable energy systems and energy efficiency, and comprehensive urban planning.
- **Long term program with critical mass** to remove market barrier, cost of material, increase domestic production, promote green finance, and insure linkages between constructor/developer/end-user and performant material/equipment producer

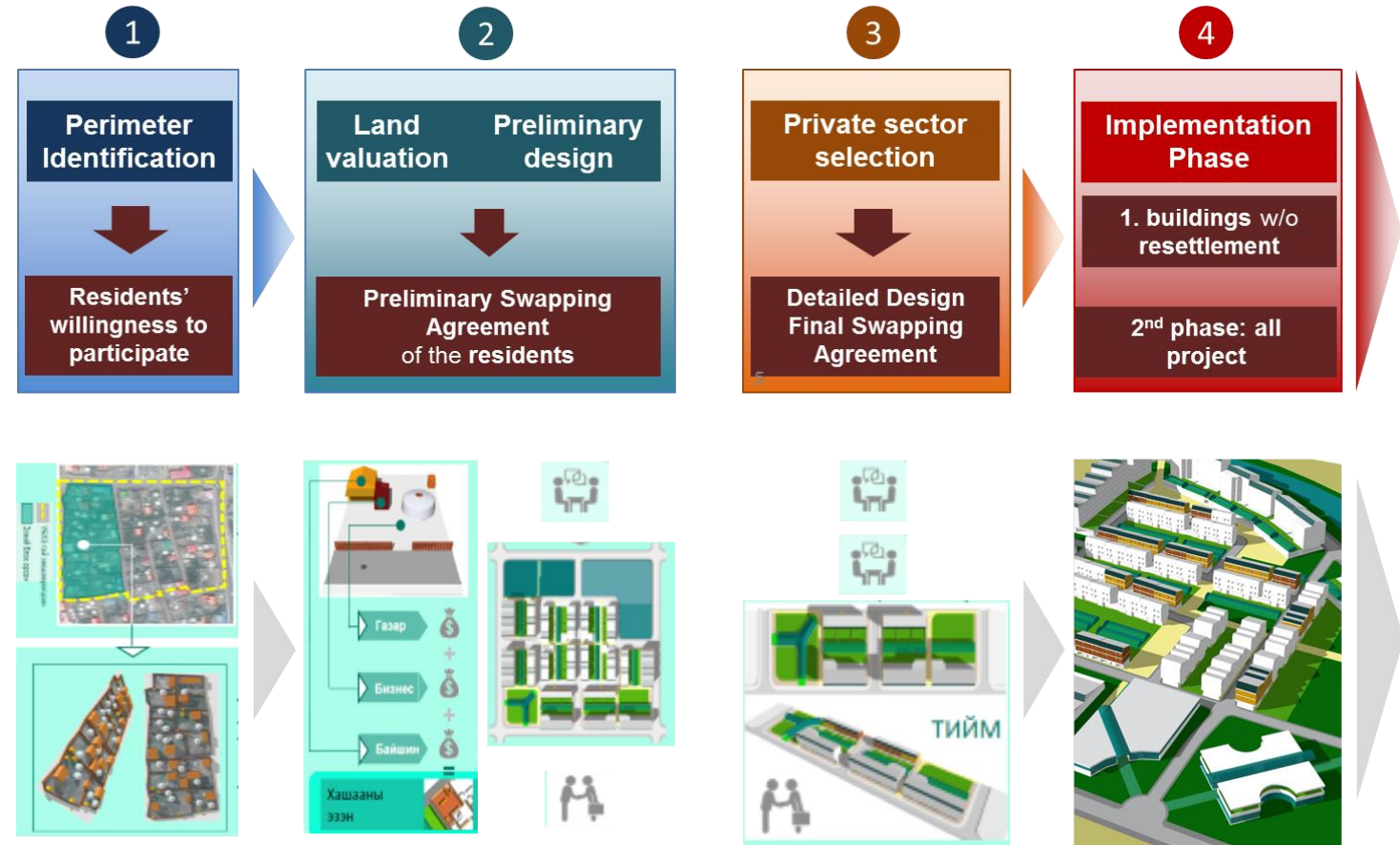
IMPLEMENTATION STEPS AND CRITERIA

Subprojects identification:

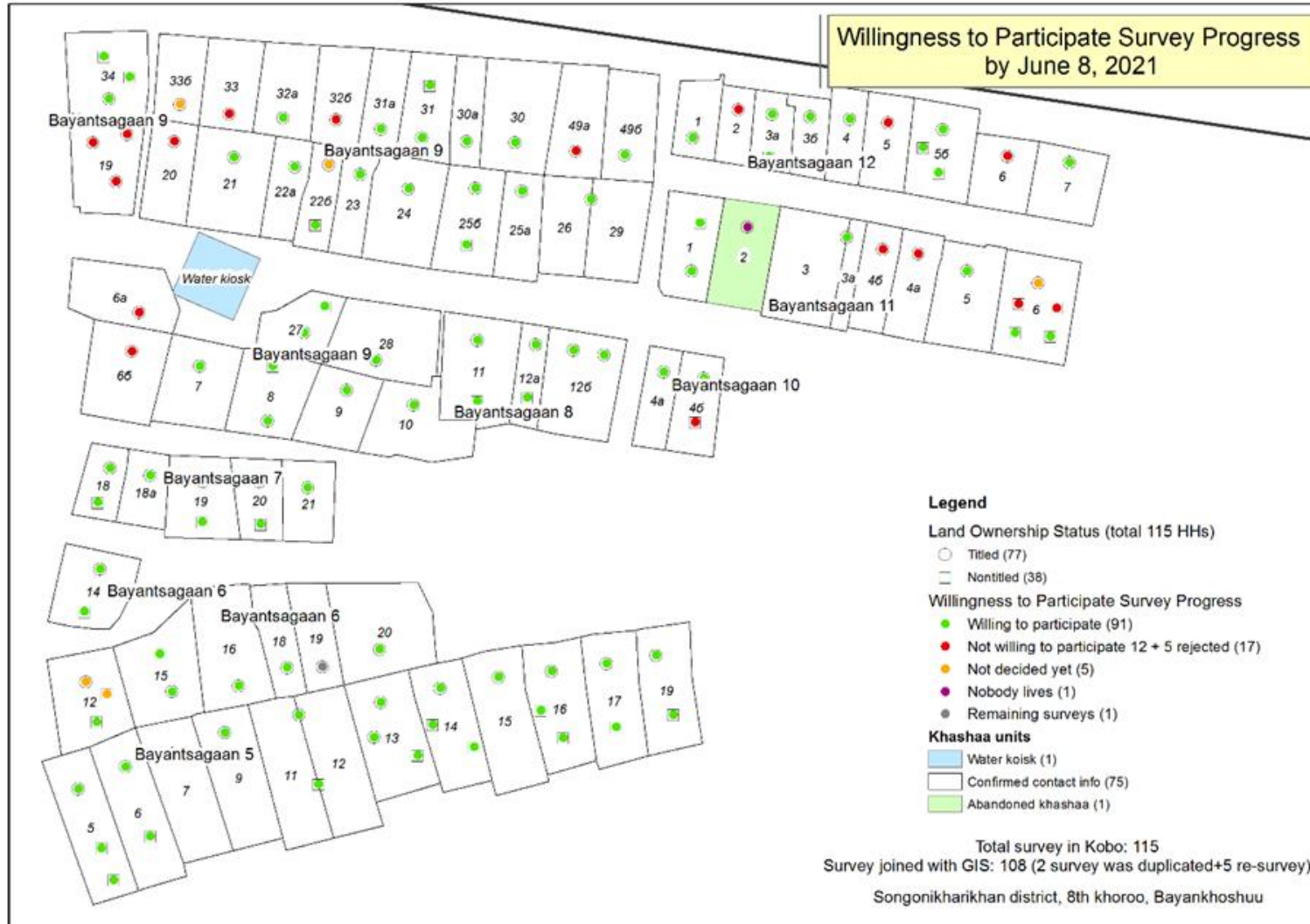
- Eco-district should be located in *ger* areas
- Close to main trunk Infrastructure
- Demand based

Eco-district development:

- 100% landowner willing to participate (voluntary resettlement)
- Financially feasible
- In line with master plan



Bayankhoshuu - Willingness to Participate (WPS)



80% Willing

Planning is proceeding including NOSK site.

Figure 22. Overall BKH Site Plan (B-15 & N-4 sites)

INTEGRATION AND SYNERGIES FOR RESILIENT HOUSING AND NEIGHBORHOOD



- Proposed Development Stages**
1. Develop **Area A** with first Social Housing (Approx. 30 units) and first Affordable Housing (Approx. 30 units) with related social, economic and green amenities for titled and non-titled residents of **Area B**.
 2. Relocate **Area B** titled and non-titled residents to completed housing in **Area A**.
 3. Develop **Area C** with first Market Rate Housing and related social, economic and green amenities.
 4. Develop cleared **Area B** Social, Affordable and Market Rate Housing and related social, economic and green amenities.
 5. Relocate **Area D** titled and non-titled residents to completed Social and Affordable Housing and related social, economic and green amenities in **Area B**.
 6. Develop **Area D** with more Social, Affordable and Market Rate Housing and related social, economic and green amenities.
 7. Continue development of **Area A** with more Social, Affordable and Market Rate Housing and related social, economic and green amenities as demand and resources permit.



Legend:

- Park
- Green Corridor
- Arterial Road
- Neighborhood Road
- Existing kindergarten
- Communication center
- Social Housing
- Affordable Housing
- Market Housing
- Commercial Area
- Cleared boundary of B15
- 30M setback
- 15M setback

Scale: 0 10 50 100m



Eco-District Complete Community Concept

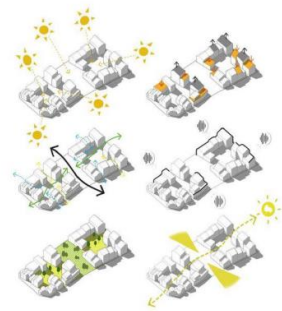
GREEN, ENERGY EFFICIENT, INCLUSIVE, INTEGRATED DESIGN



Building A – Multi-story greenhouse

Building B – Vertical PV solar panel mixed with vertical Green wall

- 1. Eco friendly materials
- 2. High performance lighting
- 3. High Performance water system
- 4. Urban green space
- 5. Activities for community
- 6. High performance envelope
- 7. High performance ventilation
- 8. Water saving technology
- 9. Green Eco power plug
- 10. Accessible apartments
- 11. Sustainable energy generation
- 12. Garbage sorting recycling point
- 13. Heat garbage collection point
- 14. Software and hardware for parks
- 15. Healthy lifestyle
- 16. Smart generation and access areas



Climate Impact and Benefits

Transformational impacts:

- Policies and capacity building conducive to energy efficiency and resilience in buildings and urban areas (EDGE Standard, urban planning, green building code);
- Efficient supply chains for renewable energy systems;
- Energy efficient construction technics and materials;
- Green banking policies; and
- Climate responsive urban planning.

Climate change cross cutting impacts

Mitigation: GHG emission reductions, Direct: 8 million tCO₂e and Total (including indirect – replications effect): 39.59 million tCO₂e.

Adaptation: 100,000 total direct beneficiaries and 1,000,000 total direct and indirect beneficiaries from reduced climate change vulnerability;

Main Takeaways and Recommendations

- Importance of strategic development phase using in-depth climate and development assessment
- Use holistic framework to appraise development problems and formulate multi-sector and pluri-disciplinary approaches;
- Focus on development and climate strategies, mechanisms and finance solutions rather than infrastructure investments;
- Elaborate public, private, people solutions to leverage private sector investments and promote community participation; and
- Develop strong partnerships and long-term programs that align create synergies between government, development partners, civil society, and private sector initiatives.
- Complex scheme that require more capacity building, more time to be prepared and implemented
- Affordability Mechanism for low-carbon and resilient housing can be challenging during implementation due to possible fluctuation of material and construction cost, as well as economic context impact on household's incomes

THANK YOU

