Korea Land and Housing Corporation

Smart Geo Expo 2022
LH Global Business Covention

Business Model for Urban Revitalization using the Clean Development Mechanism:

Pilot project in Karachi, Pakistan

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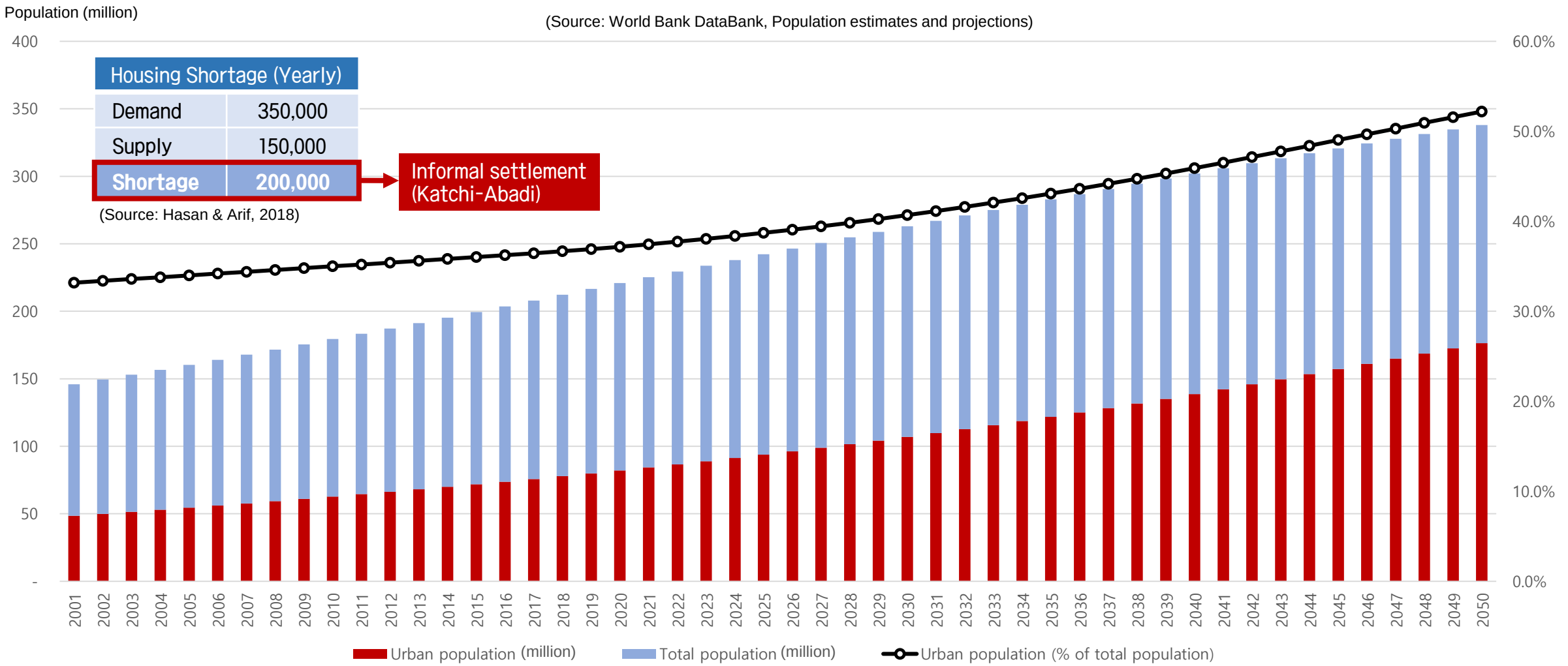
1. Backgrounds

01 Urbanization in Pakistan

Urban Population

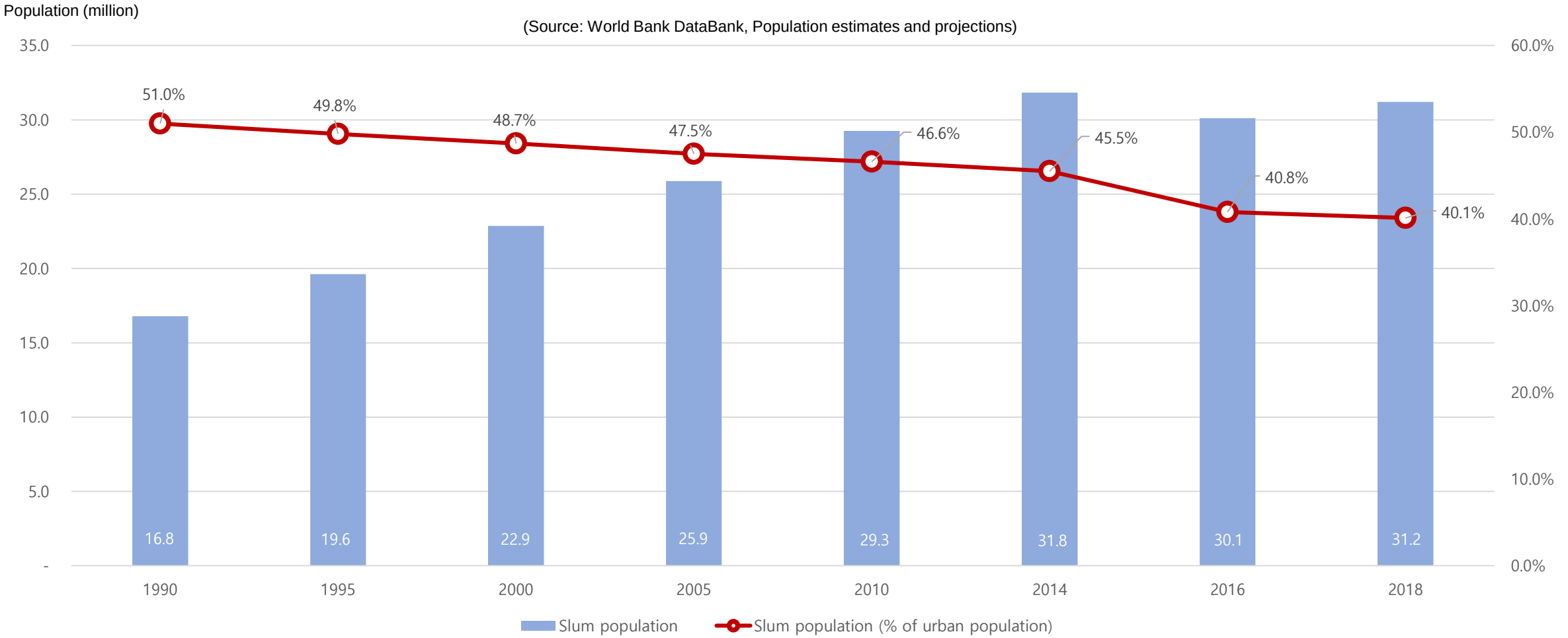
2001: 48 million (33.2%) → 2020: 82 million (37.2%) → 2050: 176 million (52.2%)



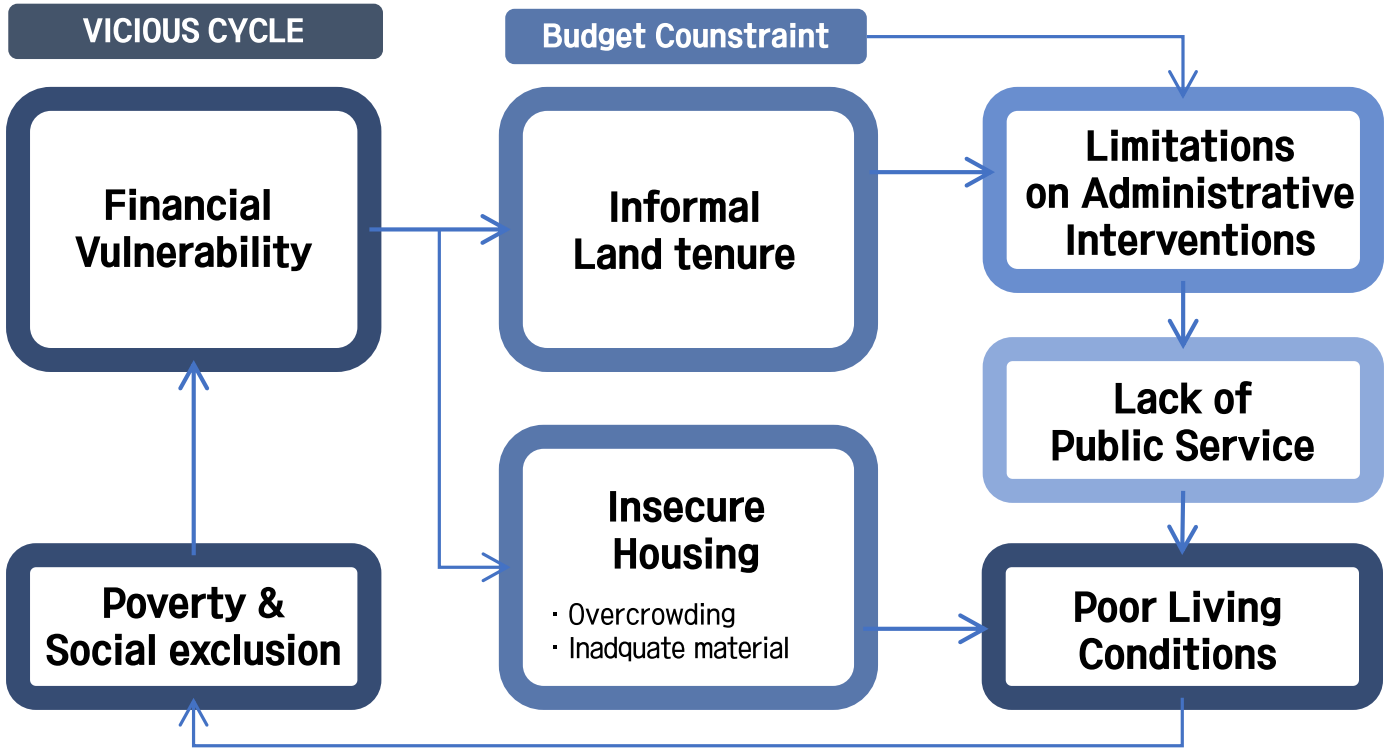
02 Population in Informal Settlements (Pakistan)

Population

1990: 16.8 million → 2005: 25.9 million → 2018: 31.2 million



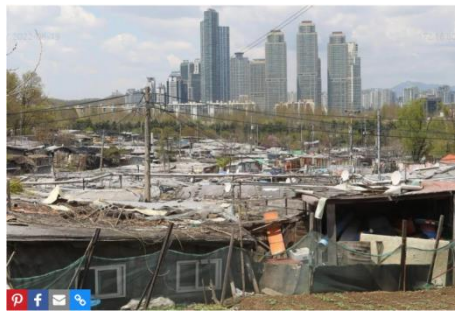
03 Problems of Informal Settlements



Services		Problems
Public Infrastructure	Drinking water	Health (Disease)
	Sanitation	Health (Disease)
	Waste water	Environment, Health (Disease)
	Drainage	Safety (Disaster)
	Solid waste	Environment, Health (Disease)
	Roads	Accessibility (Job), Safety
	Public transportation	Accessibility
	Streetlight	Safety (Crime)
	Power & Gas	Accessibility
Public Administrative Services	Education	Education (Job)
	Health service	Health
	Disaster prevention	Safety (Disaster)
	Law enforcement	Safety (Crime)
Household	Shelter space	Human right, Gender, Health
	Building structure	Safety (Crime, Disaster), Health


Rome, Italy


Paris, France


Seoul, South Korea


Rio de Janeiro, Brazil


Detroit, USA

04 Living Conditions in Katchi-Abadis (Karachi)

Informal Settlements

986 communities

Regularized Katchi-Abadis

562 communities

※ Designated by SKAA (Sindh Katchi Abadis Authority)

Field Research on Selected Communities

75 communities

※ Selected by UN-Habitat in consultations with the local experts & community leaders.

3,874 respondents

Survey

Household size	7.7 persons per household
Monthly income (per hh)	Less than USD 48 (21%), USD 48~96 (55%), More than USD 86 (24%)
Expenditure	Food (89%), Health (78%), Transport (51%), Education (49%), Rent (26%)
Jobs	Cobblers, Shopkeepers, Electrician, Janitors, Vendors, Transportation
Building material	Concrete (21%), Semi-concrete (61%), Mud (15%), Others (3%) * All options include the materials used in the forms of bricks
Road pavement	Paved roads (6%)
Water treatment	No treatment (77%), Boiling (22%), Filtering (6%), Chlorine (1%)
Fuel for cooking	LPG cylinder (42%), Wood (28%), Coal (1%), etc.
Waste collection	No routine system (46%)
Toilet	Own toilet (79%), Shared toilet (21%), Public toilet (5%), No option (3%)
School	No government school (20%)
Residence period	Over 10 years (56%)

※ The survey was conducted by the UN-Habitat Pakistan Office from March 7th to April 9th of 2022.

05 Major Problems: Drinking Water

95% of 76 Katchi-Abadis have Drinking Water issues. (Quantity, Quality, Accesibility, Affordability)

Contaminated water collection sources

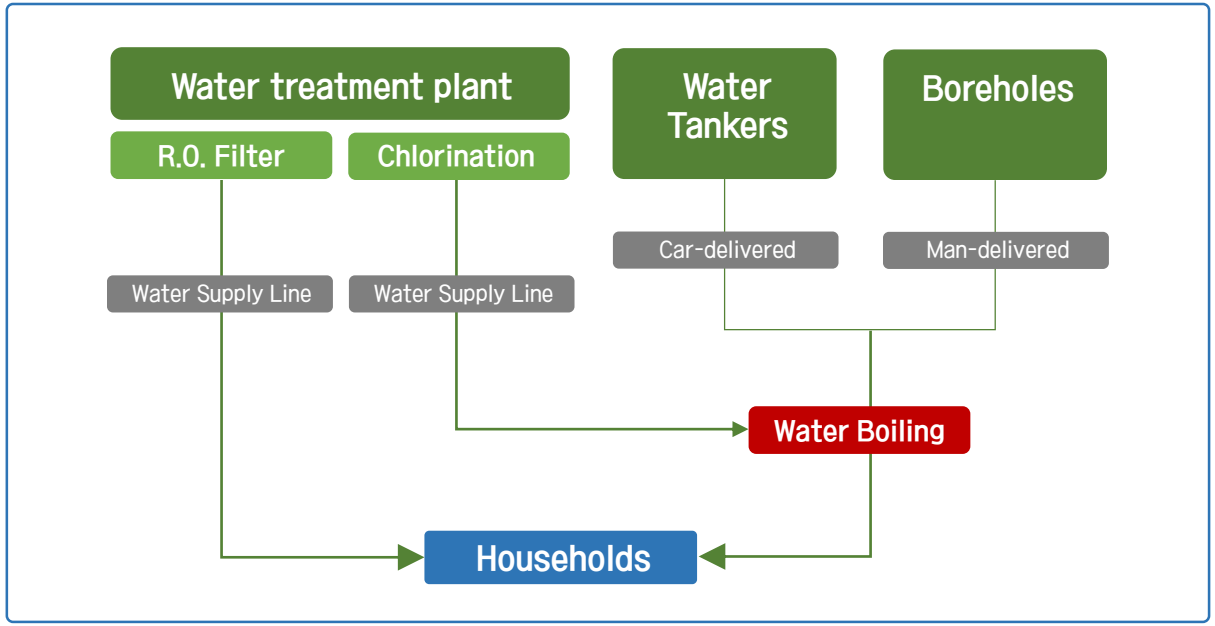
- Streams: Waste water & sewage from industries & households
- Underground water: Highly saline

Few and Poorly maintained Water treatment facilities

- 62% of the communities have no water plant in the region
- 13% have no RO Membrane filter, 87% use Chlorination only (partially leaked)

Limited supply of water

- Sources: Piped water 52%, Boreholes 21%, Tankers 16%, Others 15%
- Access: 31% has no access to water supply line
- Supply: None 13%, weekly 50%, daily 9%, Anytime 29%



(Source: Situational analysis on 76 informal settlements (Katchi-Abadis) in Karachi, Pakistan, UN-Habitat)

06 Major Problems: Shelters & Streets

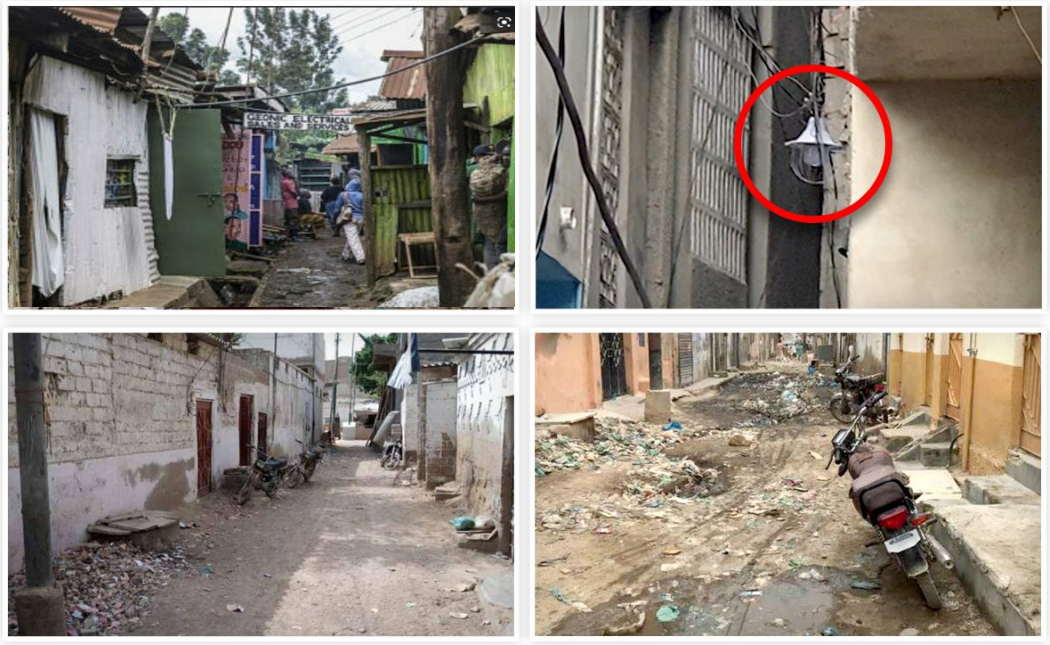
Houses and streets in Katchi-Abadis → Not safe enough to meet the basic living standards

Overcrowding, Damaged walls & Insecure structures

- 6~15 family members (7.7 in average) live in houses with 1~2 bedroom
- Building materials of houses: Semi-concrete 61%, Mud or tents 18%
- Damaged walls are frequently seen

Lack of street lights

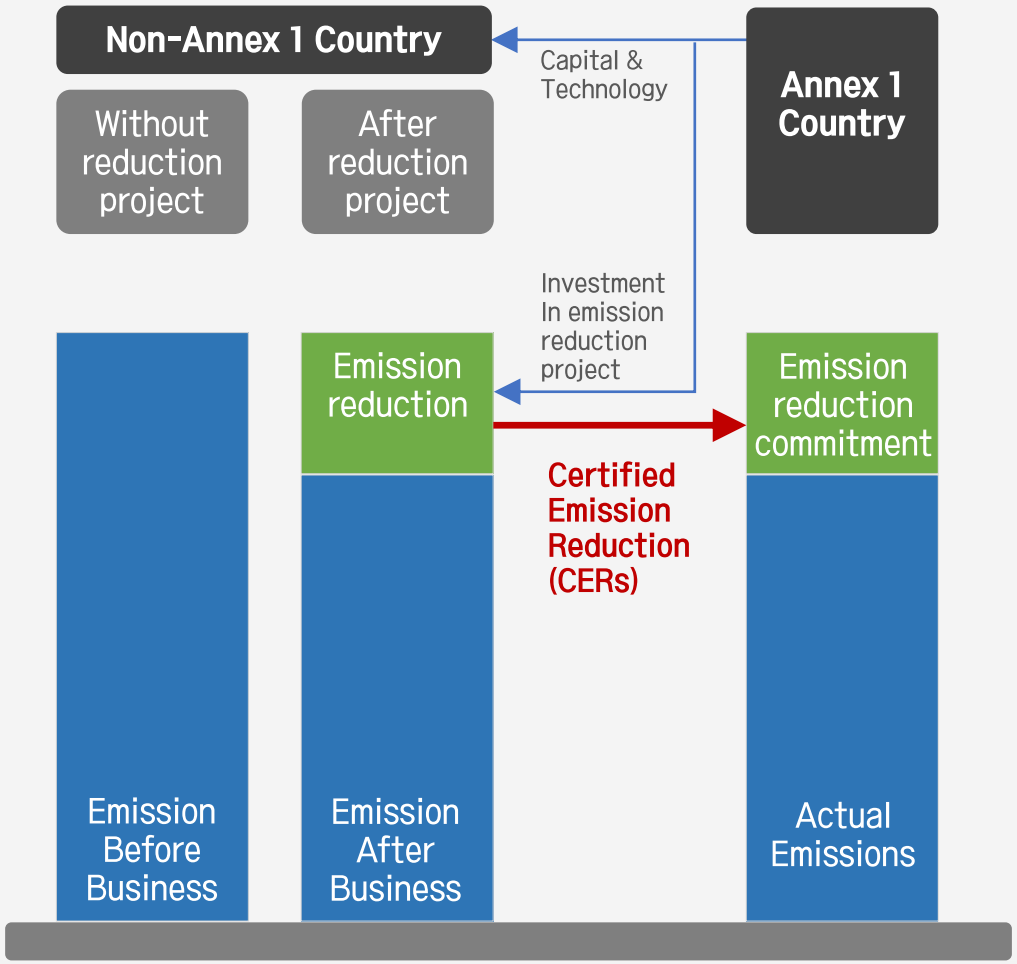
- 77% of streets have no street lights (2 per 1,000 residents)
  → Frequent crimes and accidents
- 41% of the street lights are established and managed by local residents



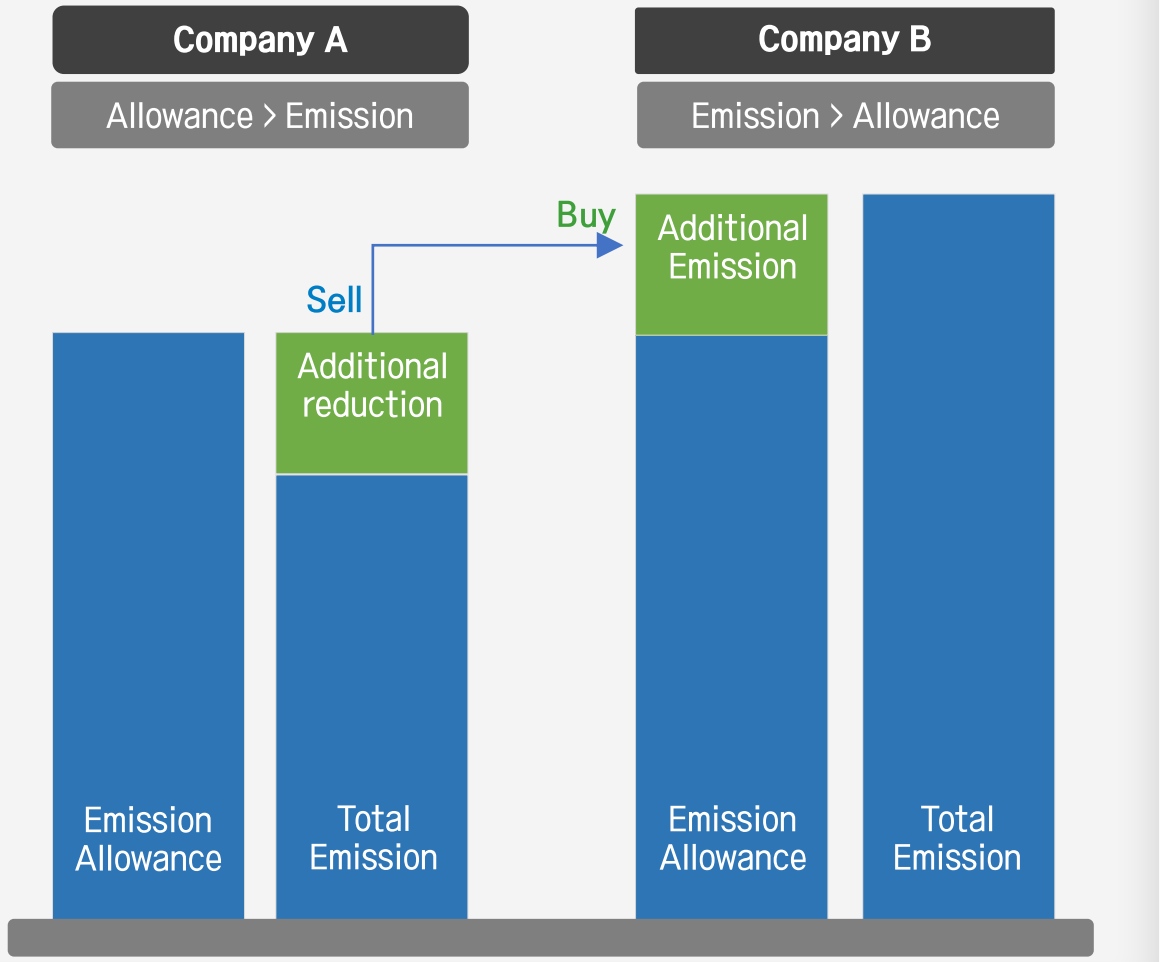
(Source: Situational analysis on 76 informal settlements(Katchi-Abadis) in Karachi, Pakistan, UN-Habitat)

2. Business Model

Clean Development Mechanism (CDM)



Emission Trading Scheme (ETS)



08 Business Structure

Upgrading Living Environment

Green & Sustainable
Urban Revitalization
without government investment

GHG Emission Reduction

INVESTMENT
(LH → Pakistan)

Upgrading living environment

- Water purification facilities
- Production of Low carbon bricks (for housing rehabilitation)
- Street lights (energy-efficient bulbs)
- Non-CDM type urban development

CREDIT ISSUANCE
(UNFCCC → LH)

Monitoring & Obtaining CERs

- **Monitoring** of emission reduction (CME)
- **Verification** of emission reduction (DOE)
- **Certification & CERs Issuance** (UNFCCC → LH)

REVENUE GENERATION
(LH → Industries)

Selling CERs at the market

- **Exchange of CERs** for Korean Offset Credit (KOC) (Korean Government → LH)
- **Listing KOCs on the exchange** (LH → KRX)
- **Selling KOCs and generating revenue** (LH → Industries)

09 Framework of the Programme (PoA & CPA)

Programme of Activities (PoA)

Pilot Project (Phase 1)			Project (Phase 2)			Project (Phase 3 & @)		
CPA 1	CPA 2	CPA 3	CPA 4	CPA 5	CPA 6	CPA 7	CPA 8	CPA @

Karachi, Sindh

Water	Brick	Streetlight
		
924 thousand tCO_2e	362 thousand tCO_2e	92 thousand tCO_2e

Other regions in Pakistan

- Water
- Brick
- Streetlight
- Solar power

3. Programme of Activities (PoA, Draft)

10 PoA-DD Overview

Title	• Slum upgrading and GHG emission reduction project in Pakistan by the Korea Land and Housing Corporation
Host Party	• Islamic Republic of Pakistan
Designated National Authority (DNA)	• Ministry of Climate Change of Pakistan
Project Participants	• Korea Land and Housing Corporation (LH), Project Team ATR Inc. (ATR)
Coordinating/managing Entity (CME)	• Project Team ATR Inc. (ATR)
Physical/geographical Boundary	• Geographical area of all the CPAs to be included in this PoA (within the National boundary of Pakistan)
Categories of the Programme	• Establishment of water purification facilities to supply safe drinking water • Brick factory installation with improved process • Installation and replacement of energy-efficient streetlights • Supply of renewable energy using solar power
Duration of PoA	• 28 years from the date of PoA-DD Registration at the UNFCCC (early 2023) ※ Duration of CPA-DD: 10 years from the date of CPA-DD Registration
Funding	• Investment from LH (No public funding or ODA)
Other contents included	• General operating and implementing framework • Voluntariness • Contribution to sustainable development • Technologies/measures • Management system • Demonstration of additionality • Generic overview of potential CPAs (not specifying project boundaries)

11 CDM Methodologies

Aopted 4 among 222 CDM methodologies registered at the UNFCCC

Registered Methodologies (UNFCCC)

Categories	# of methodologies
Large-scale CDM project activities	92
Small-scale CDM project activities	100
Large-scale A/R CDM project activities	1
Small-scale A/R CDM project activities	2
Carbon capture & storage (CCS) project activities	-
Total	195

Methodologies in Urban sector

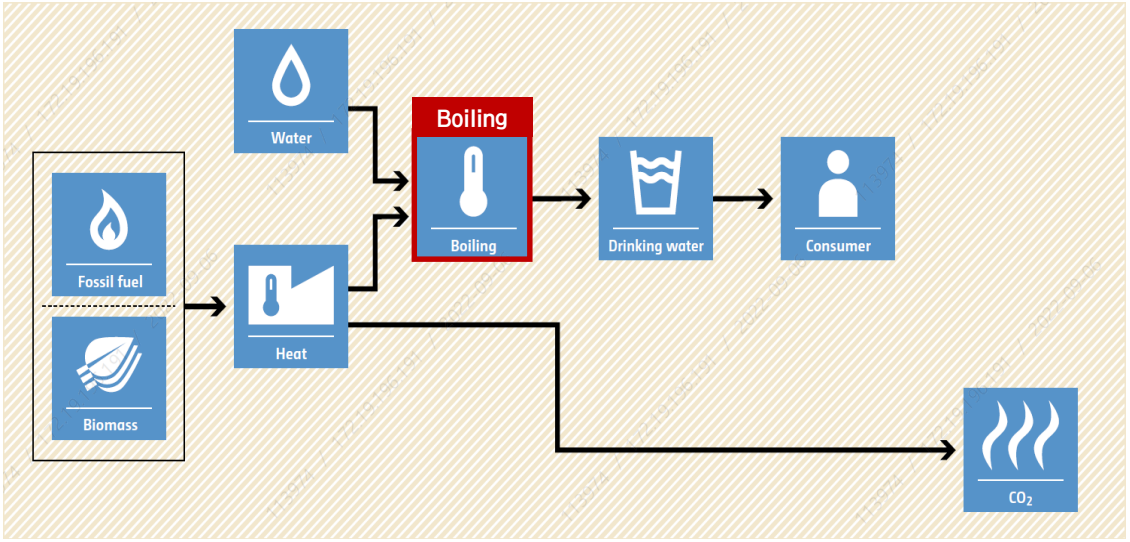
Categories	# of Methodologies
Household & building Energy generation & efficiency	20
Waste management & wastewater	16
Transport	12
Others	3
Total	51

Methodologies included

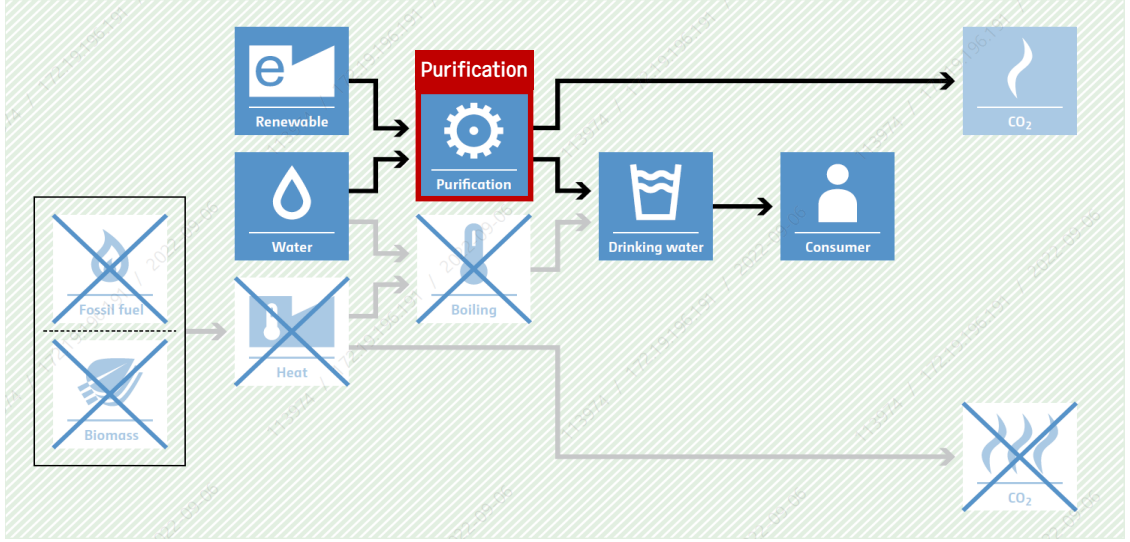
Code	Name
AMS-I.F.	Renewable electricity generation for captive use and mini-grid
AMS-II.L.	Demand-side activities for efficient outdoor and street lighting technologies
AMS-III.AV.	Low greenhouse gas emitting safe drinking water production systems
AMS-III.Z.	Fuel switch, process improvement and energy efficiency in brick manufacture

12 Methodology: Drinking Water (with Solar Power)

Baseline Scenario (As-Is)



Project Scenario (To-Be)




Water tanker


Boreholes

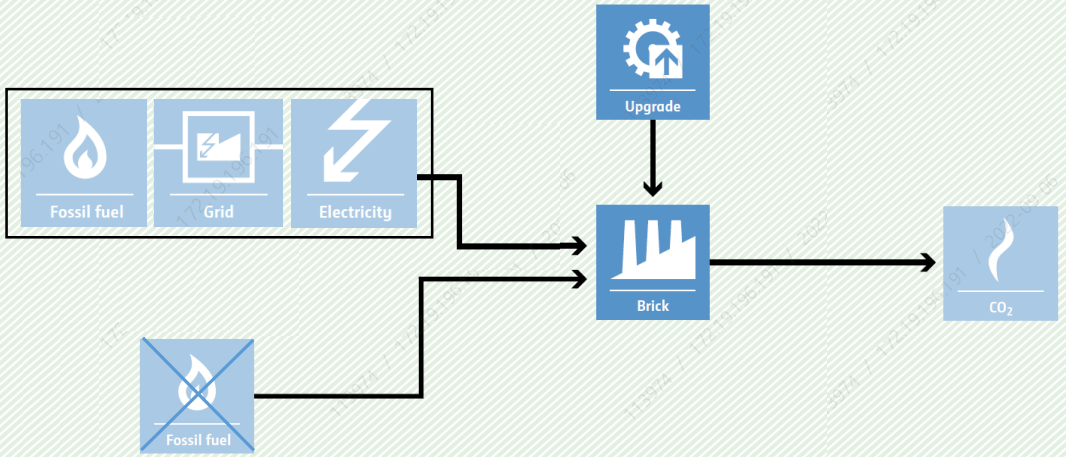

Water boiling

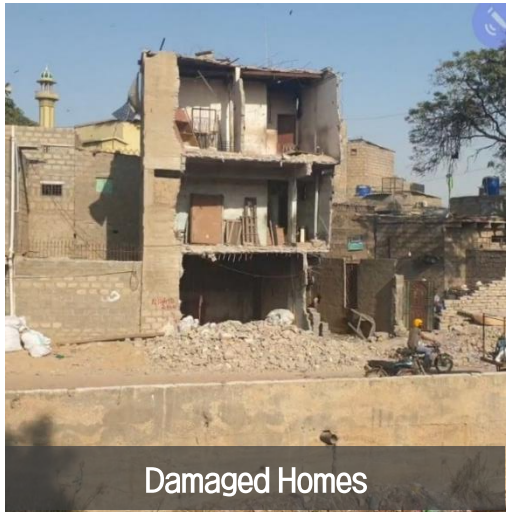
Water purification facility with membrane filter

13 Methodology: Low-carbon Bricks

Baseline Scenario (As-Is)

Project Scenario (To-Be)




Damaged Homes

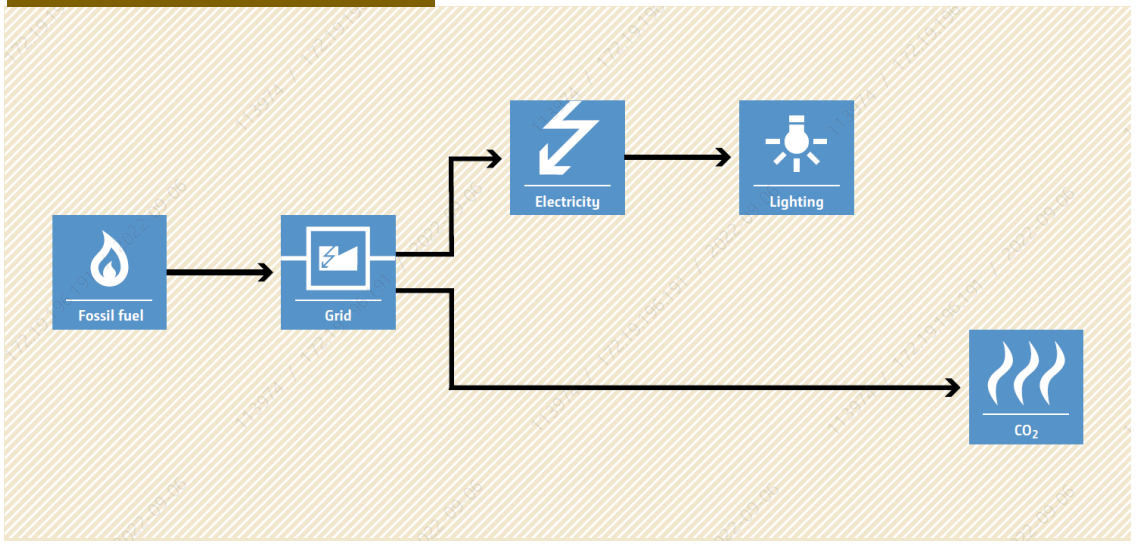

Burning process for Brick production


Fly Ash Brick (No burning)

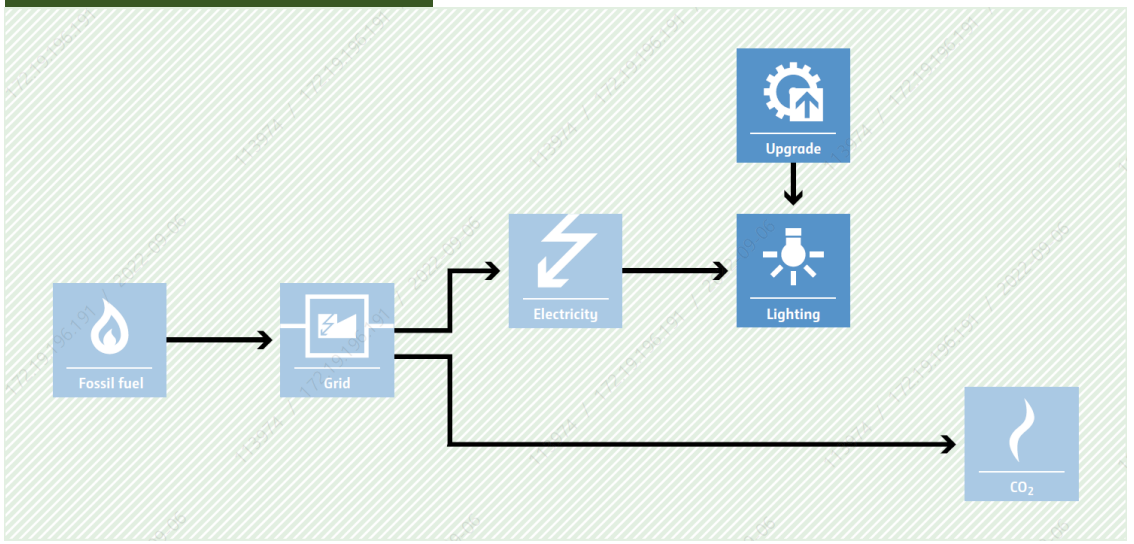

Housing Restoration

14 Methodology: Energy-efficient Streetlights

Baseline Scenario (As-Is)



Project Scenario (To-Be)




Lack of streetlights

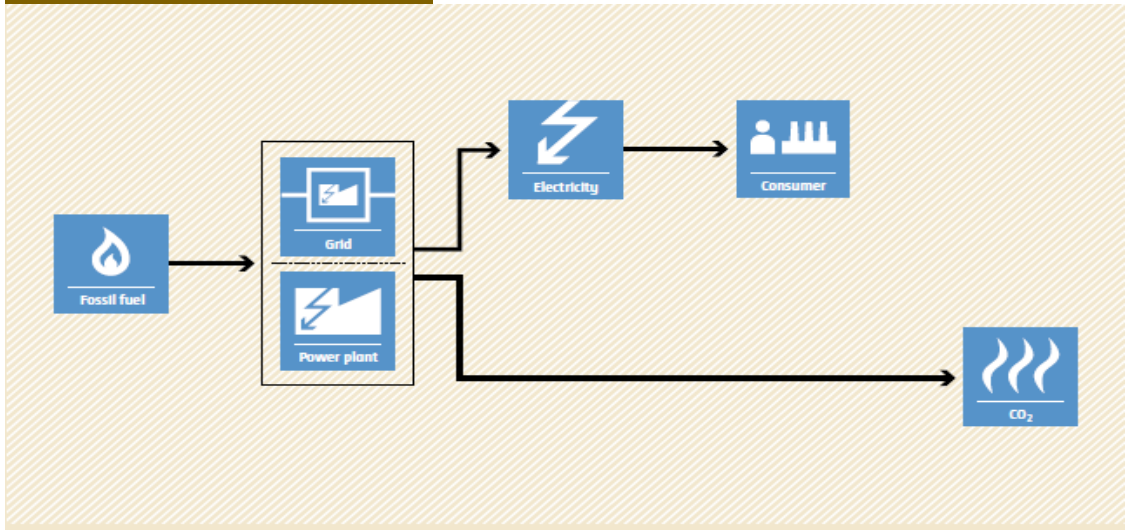

Low-efficient streetlights


LED streetlights (Alleyways)

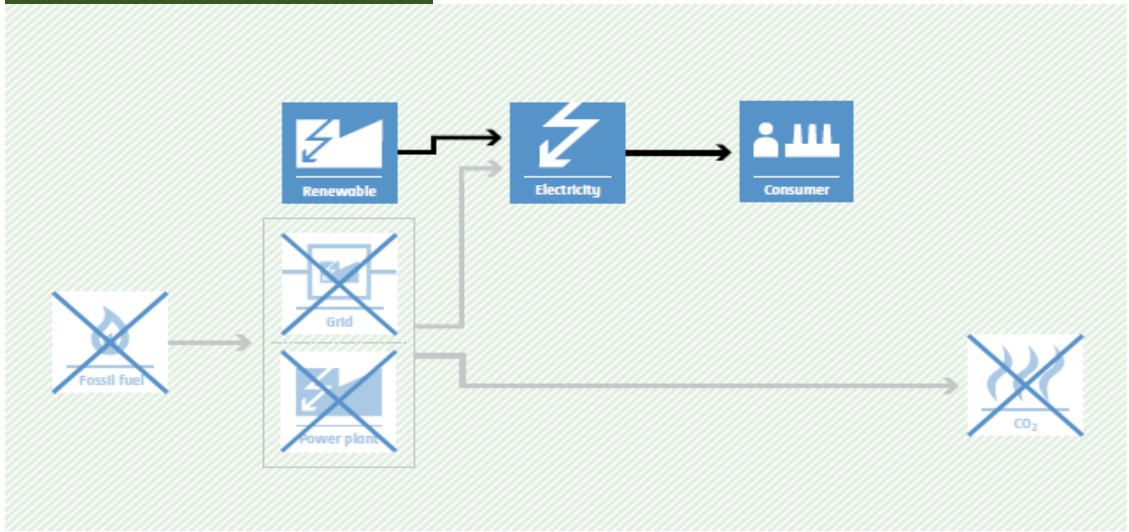

LED streetlights (KMC & DMC Roads)

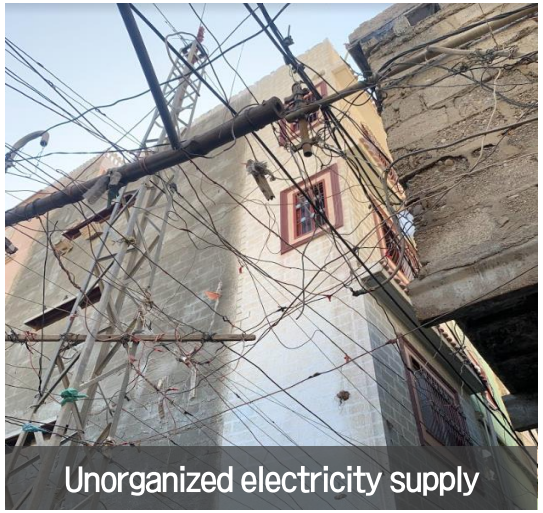
15 Methodology: Renewable Energy (Solar power)

Baseline Scenario (As-Is)

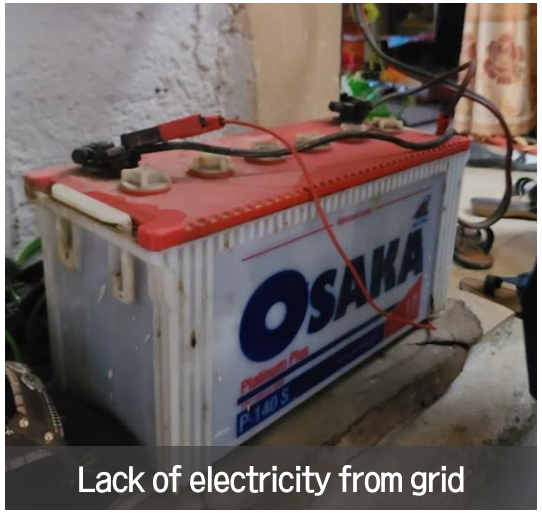


Project Scenario (To-Be)





Unorganized electricity supply



Lack of electricity from grid

Electricity supply with solar power

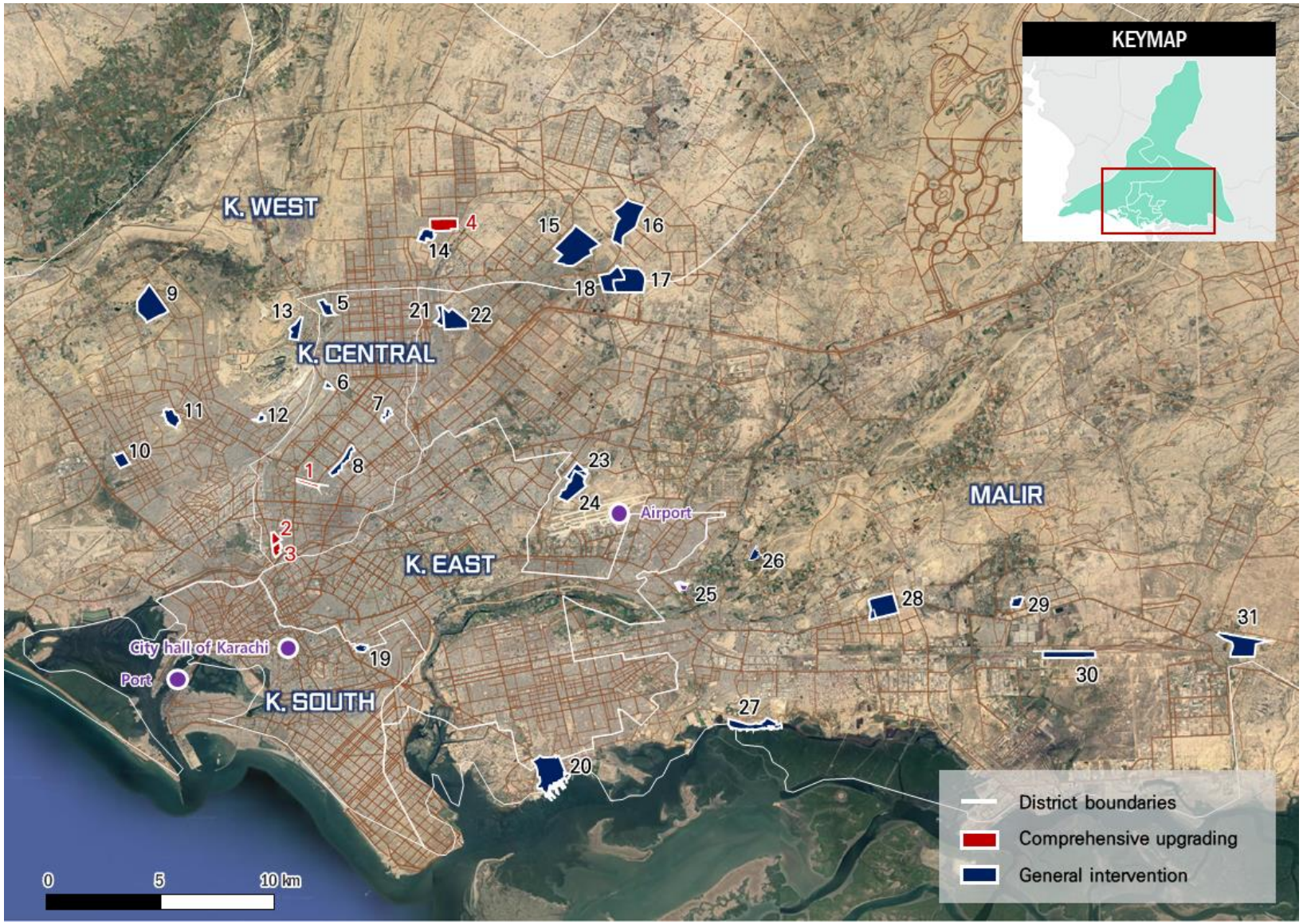
4. Component Project Activities (CPA, to be developed)

16 Selection of Target Communities (Tentative)

Informal Settlements	**986** communities	• All Katchi-Abadis in Karachi including Non-regularized Katchi-Abadis.
Regularized Katchi-Abadis	**562** communities	• Katchi-Abadis registered to and regularized by the Provincial government.
Communities for Field Survey	**75** communities	• Communities selected for Field survey after consulations with local expersts and community leaders.
Excluded Communities	**44** communities	• Communities excluded from final selection.
High Crime Rate	8 communities	• Communities which requires escort by police. (having difficulties in implementation of the project)
Lack of Economies of Scale	36 communities	• Small communities under the population of 3,500 which does not have demand for 1 water facility.
Selected Communities	**31** communities	• **Communities selected for the Pilot project.**
Comprehensive upgrading	4 communities	• Water, Brick, Streetlights + Upgrading open spaces (Community parks) + Master planning
General intervention	27 communities	• Water, Brick, Streetlights

※ Final communities will be decided after consultations with the Central & Local governments of Pakistan and community leaders.

17 Locations (31 communities)



Communities			Households	Population
Central	01	Mujahid Colony	2,626	16,376
	02	Purana Golimar	1,936	12,079
	03	Taj Goth	1,672	10,835
West	04	Khuda ki Basti	4,753	28,232
Central	05	Mary Goth	2,406	15,645
	06	Nazarat Nagar	2,457	17,196
	07	Brohi Goth	1,605	13,552
	08	kausar niazi colony	5,427	35,588
West	09	Ishaq Goth	822	4,844
	10	Zaiabad	723	4,339
	11	Tauheed Colony	2,899	14,498
	12	Hussain Baloch Goth	1,490	9,556
	13	Meer Muhammad Goth	1,403	12,287
	14	Mullah Hussain Goth	768	5,061
	15	Hindo Goth	1,619	11,814
	16	Yasrab Goth	3,297	29,892
	17	Ahmed Brohi Goth	821	5,532
	18	Faysal Mari Goth	590	4,084
East	19	Chanesar Goth	2,926	18,142
Malir	20	Ibrahim haideri	9,345	54,522
	21	Muhammadi Goth	1,772	12,594
	22	Saifal Abro Goth	3,034	18,993
	23	Dhani Bakhsh goth	6,686	38,096
	24	Bithiabad	9,904	59,364
	25	Sardar Nagar	1,044	6,061
	26	Mullah Essa Brohi Goth	1,063	5,347
	27	Rehri Goth	3,480	18,088
	28	Abdullah Goth	2,649	18,024
	29	Soomrani Jokhio Goth	2,579	12,910
	30	Noor Hasan Jokhio Goth	985	7,406
	31	Mir Muhmmad Goth -1	1,403	12,287
Total (31 communities)			84,184	533,244

18 CPA 1: Methodology (Water)

Baseline Scenario (As-Is)

Project Scenario (To-Be)

CDM

- Installation of Water Purification Facilities
- Production of Safe Drinking Water (No water boiling)

Other Activities

- Distribution of Drinking Water (Facilities→Communities→Households)
- Water Consumption (Households)
- Monitoring of Water Distribution & Use (UN-Habitat, Munitipalities, Communities)

19 CPA 2: Methodology (Bricks)

Baseline Scenario (As-Is)

CDM

- Installation of New Production Line for Fly Ash Bricks
- Production of Fly Ash Bricks (No burning & GHG emission)

Other Activities

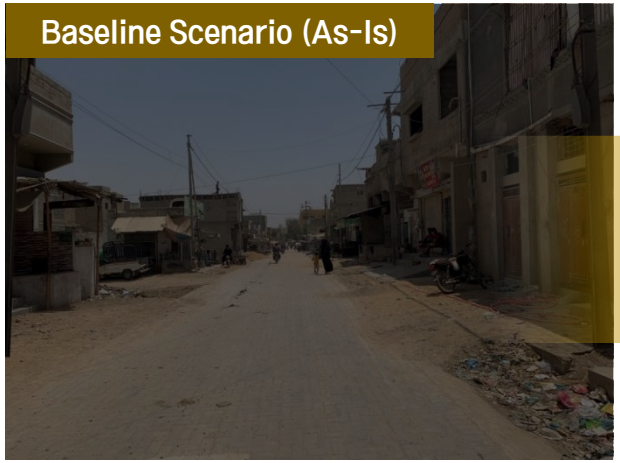
- Distribution of Flay Ash Bricks (Manufacturer→Communities→Households)
- Restoration of Damaged Housings (Households)
- Monitoring of Brick Distribution & Use (UN-Habitat, Munitipalities, Communities)

Project Scenario (To-Be)

Housing restoration using Low-carbon Bricks

20 CPA 3: Methodology (Streetlights, Katchi-Abadis)

Baseline Scenario (As-Is)



CDM

Installation of New LED Streetlights
(using existing Utility poles)

Operation of LED Streetlights
(Low energy consumption & GHG emission)

Project Scenario (To-Be)

21 CPA 3: Methodology (Streetlights, KMC/DMC Roads)

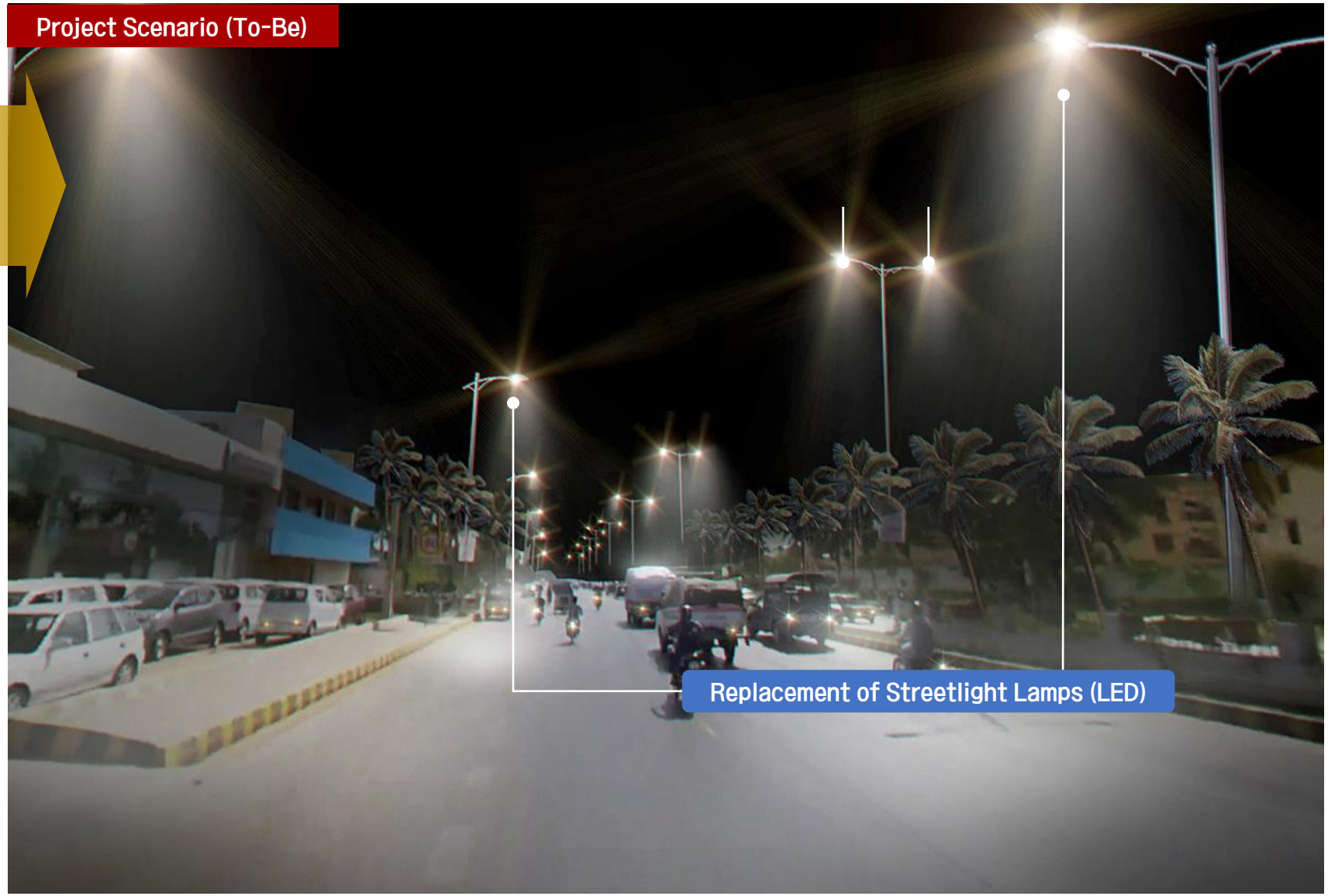
Baseline Scenario (As-Is)

CDM

Replacement of Low-efficient Streetlights to LED lights

Operation of LED Streetlights
(Low energy consumption & GHG emission)

Project Scenario (To-Be)



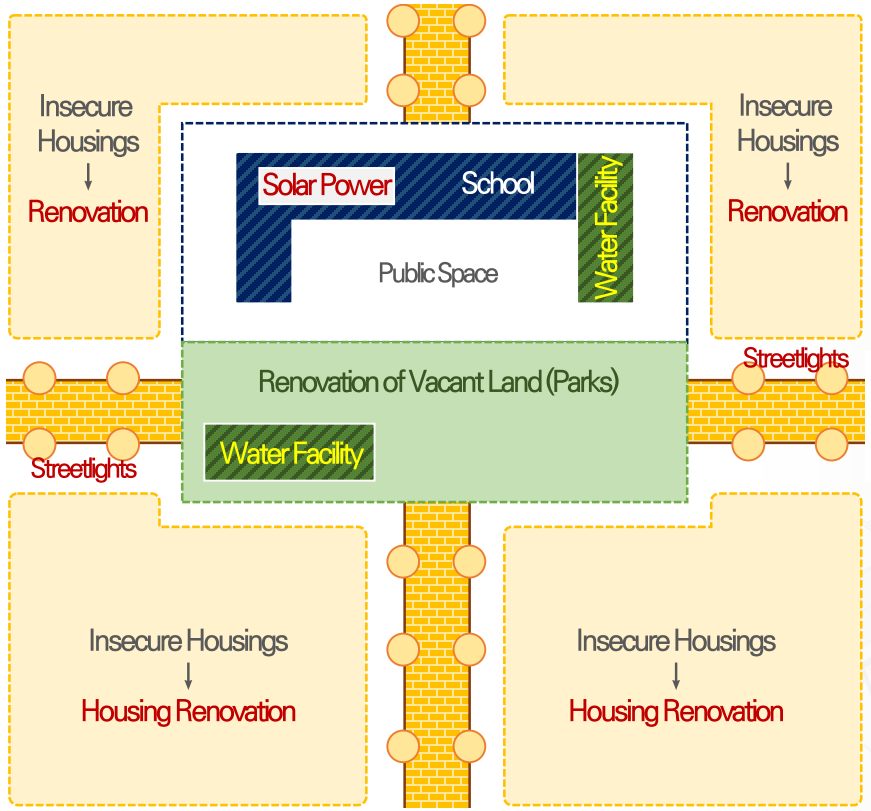
22 Expected Outcomes

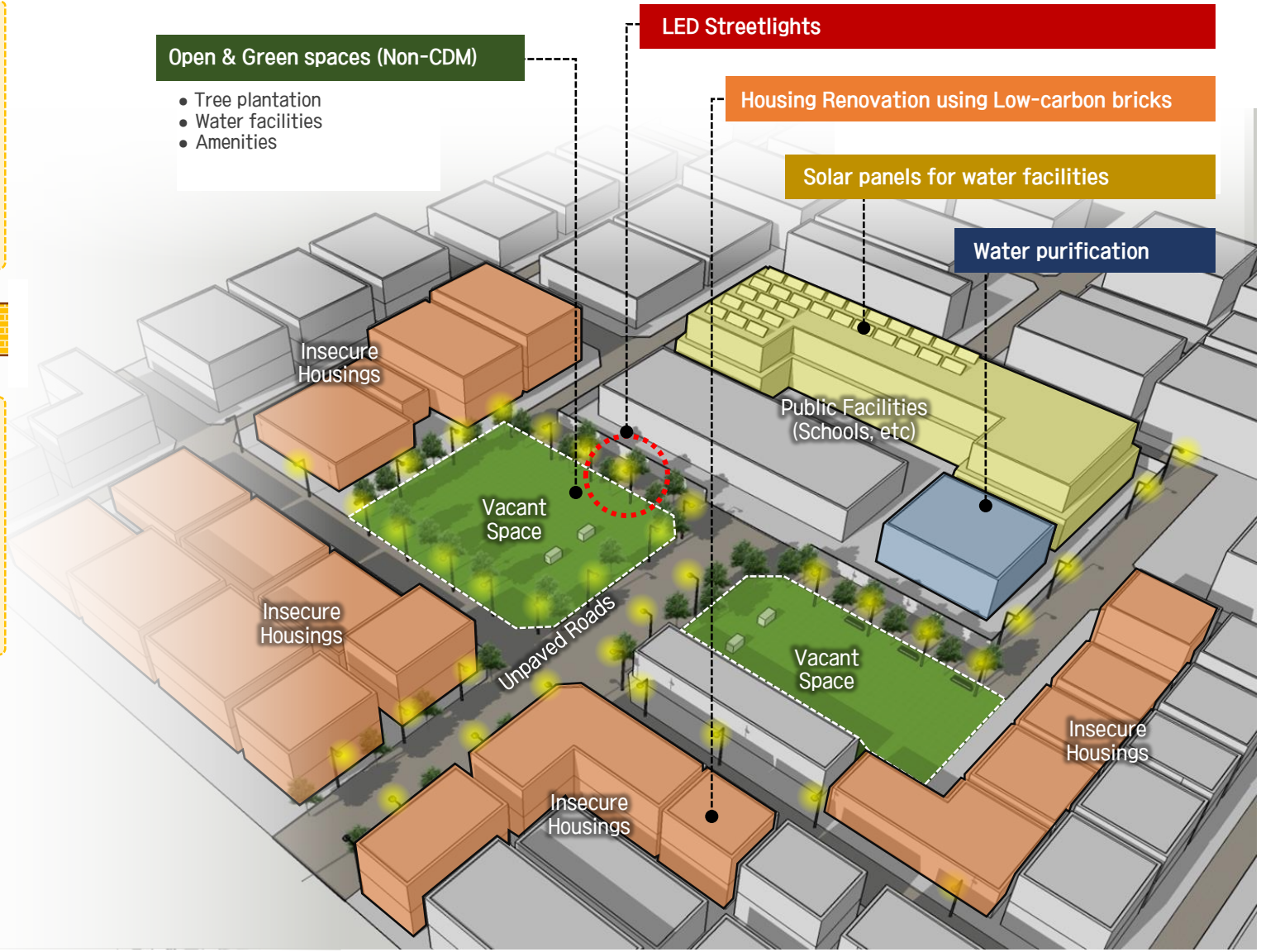
		Water	Bricks	Streetlights	Community Parks	Total
Quantity		213 water facilities (4 million L/d)	Production: 500 million Supply: 200 million	21 thousand Streetlights - New Installation: 930 - Replacement: 20,000	8 community parks (20~30 thousand ㎡)	N/A
Estimated Cost (USD)	Current price	14.3 million USD	11.8 million USD (for 200 million bricks)	1.2 million USD	0.5 million USD	27.7 million USD
	Nominal price*	19.2 million USD	18.9 million USD	1.6 million USD	1.5 million USD	40.2 million USD
Expected Emission rreduction		920 thousand $tCO2_e$	360 thousand $tCO2_e$	90 thousand $tCO2_e$	N/A	1,370 thousand $tCO2_e$

* Nominal price includes all the potential inflations in the future.

5. Community Upgrading Plan

23 Basic Prototype





24 Open Spaces Renovation (Community Parks)

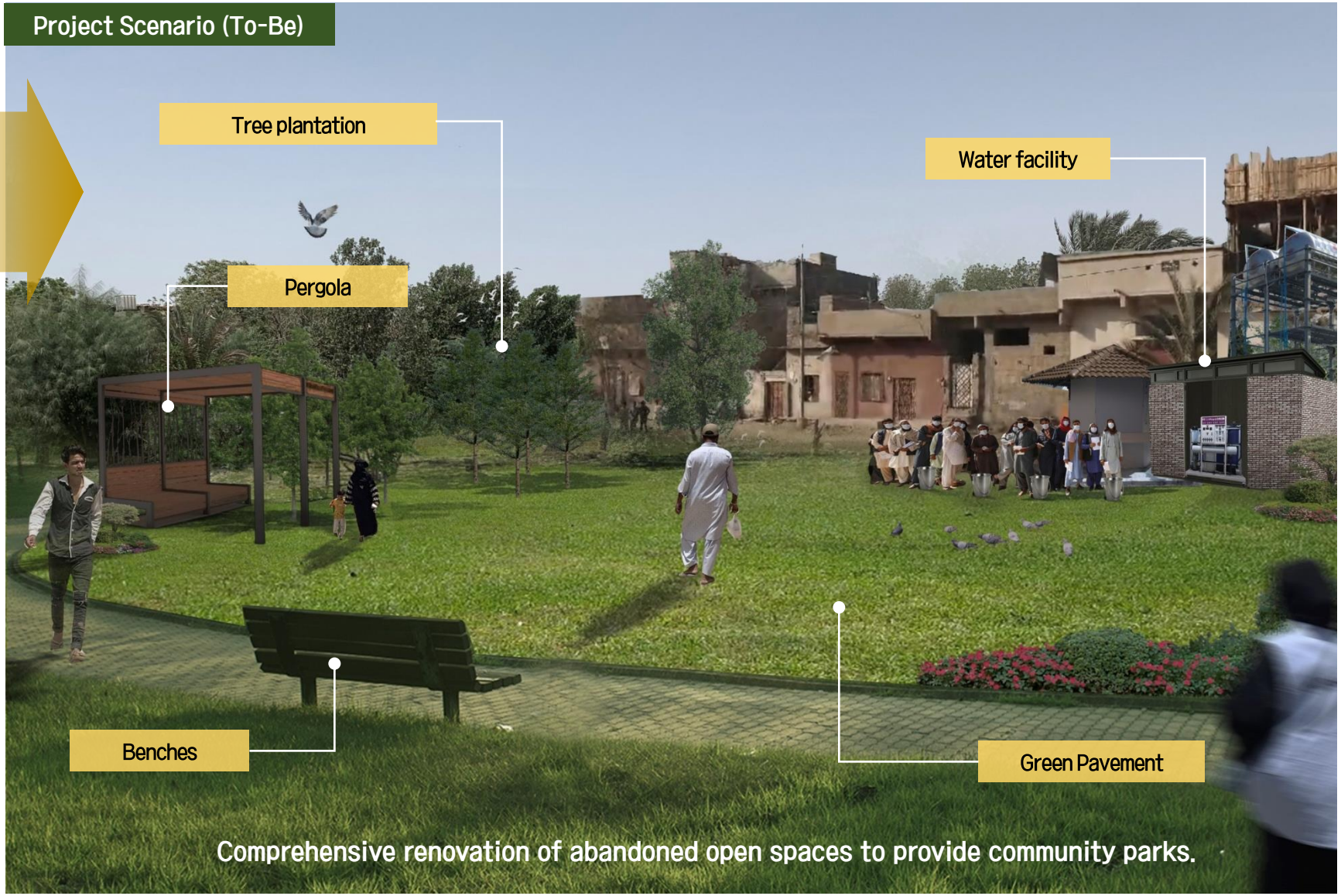
Baseline Scenario (As-Is)

Vacant Spaces

Applied to 4 selected communities
(No revenue generation)

- Mujahid Colony (11,160㎡)
- Purana Golimar (6,600㎡)
- Taj Goth (1,540㎡)
- Khuda Ki Basti (10,400㎡)

Project Scenario (To-Be)



Comprehensive renovation of abandoned open spaces to provide community parks.

25 Community Upgrading Plan (Mujahid Colony)

26 Community Upgrading Plan (Purana Golimar)

CDM Water Purification Facilities

Limited Water Supply
- Getting Water from Boreholes or Water Tankers

CDM LED Streetlights

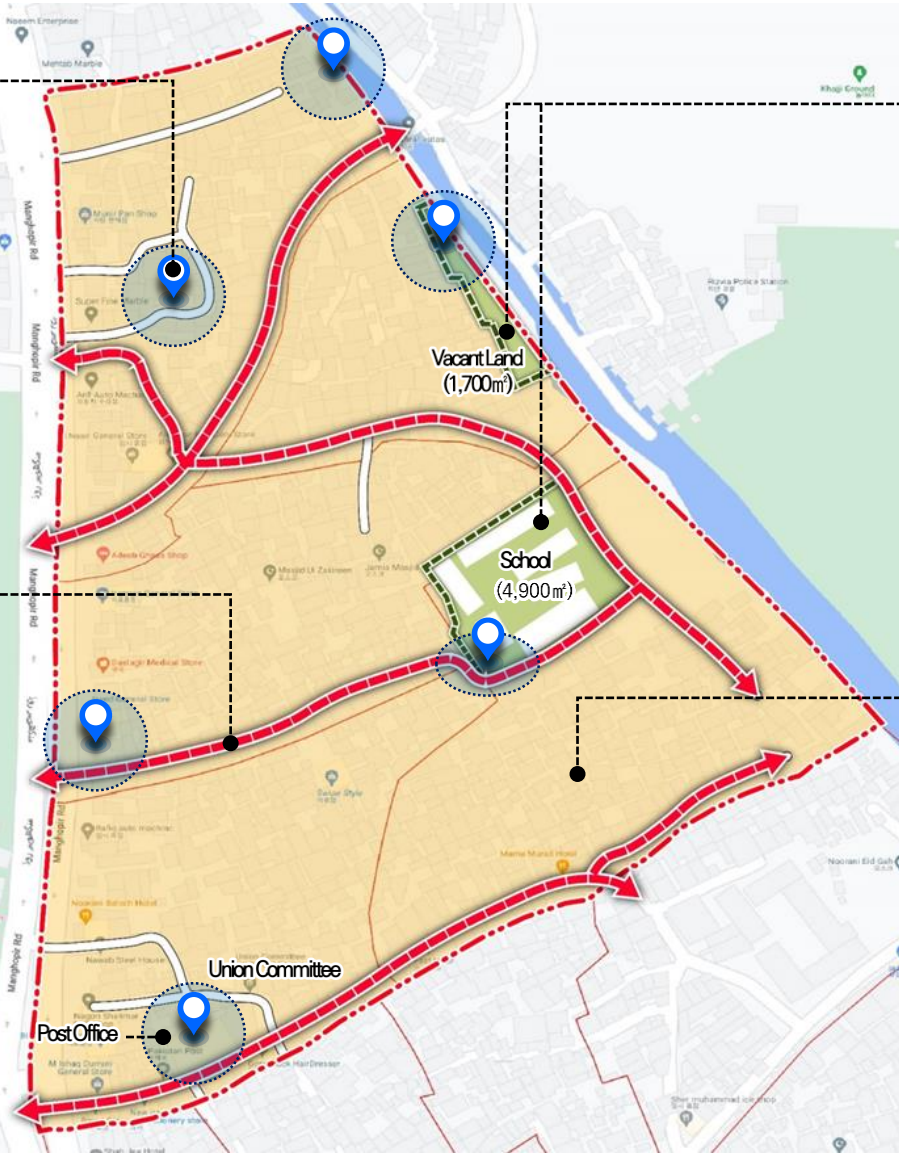
Unpaved roads with no streetlight


Non CDM Open Space Renovation

Vacant Land by the Stream & within School


CDM Housing Restoration

2 story housings with damaged walls



27 Community Upgrading Plan (Taj Goth)

CDM Housing Restoration

2~3 story homes with damaged walls

CDM LED Streetlights

Unpaved roads with no streetlight

CDM Water Purification Facilities

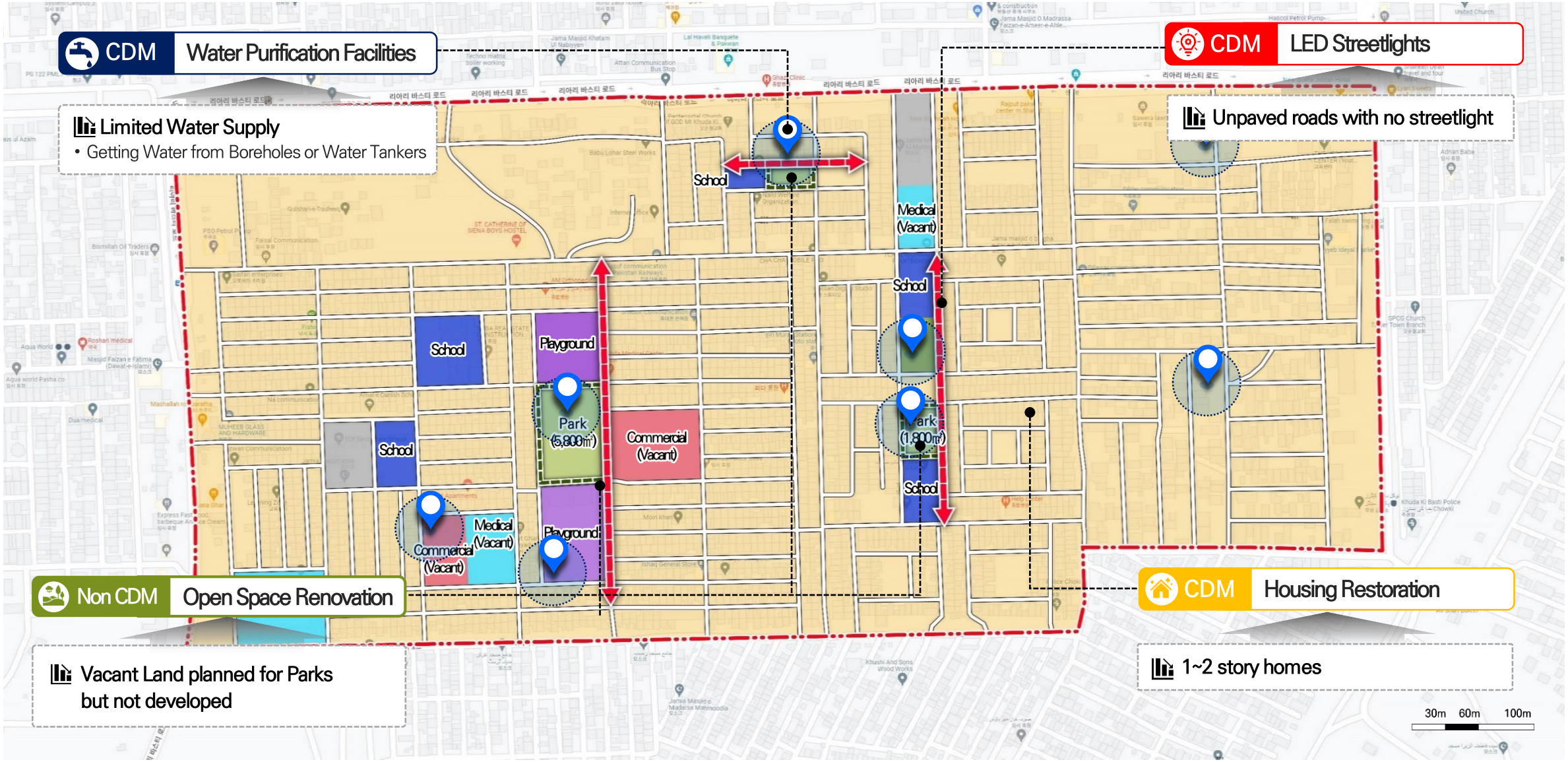
Limited Water Supply

- Getting Water from Boreholes or Water Tankers

Non CDM Open Space Renovation

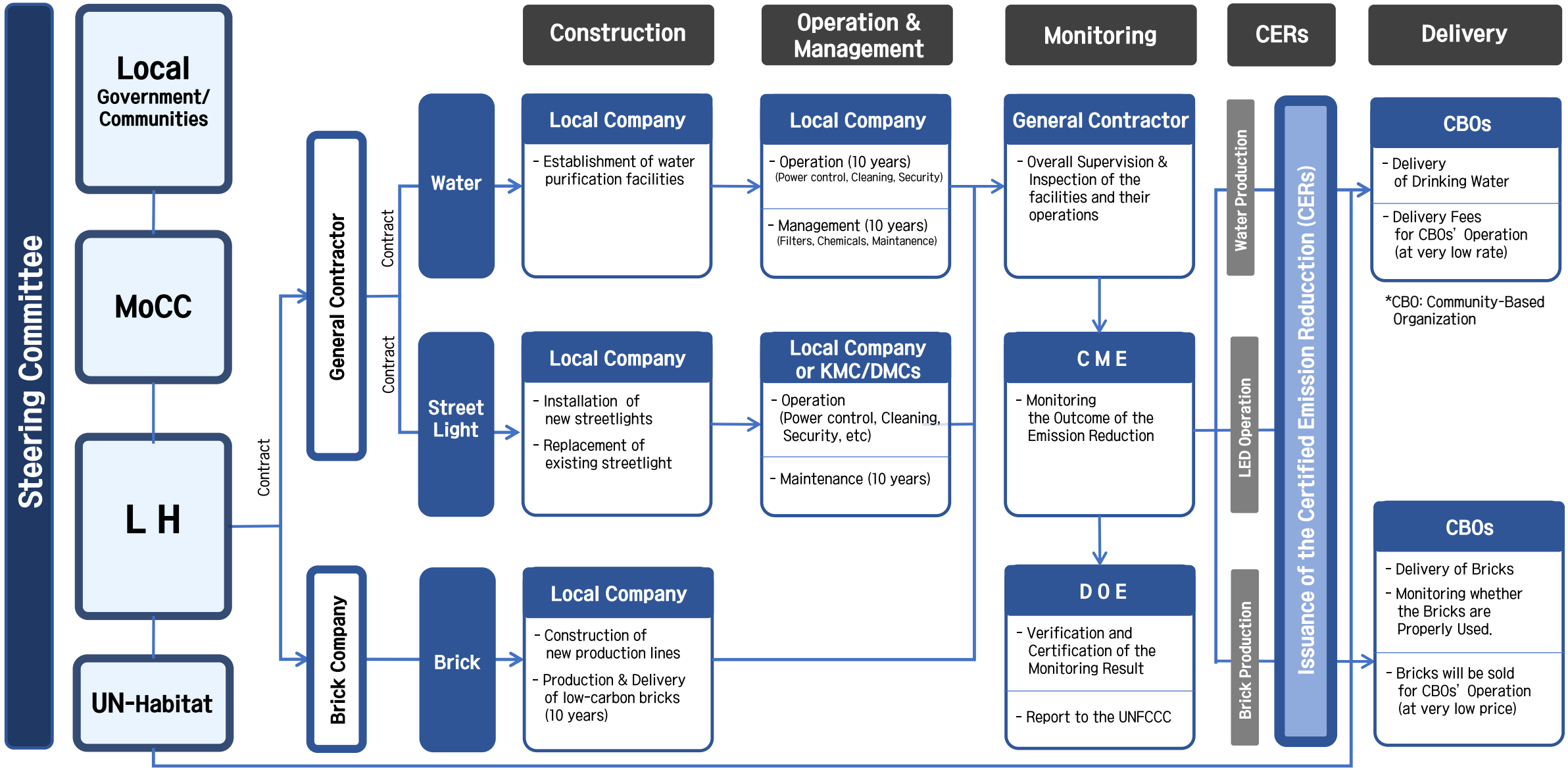
Vacant Land within School

28 Community Upgrading Plan (Khuda Ki Basti)

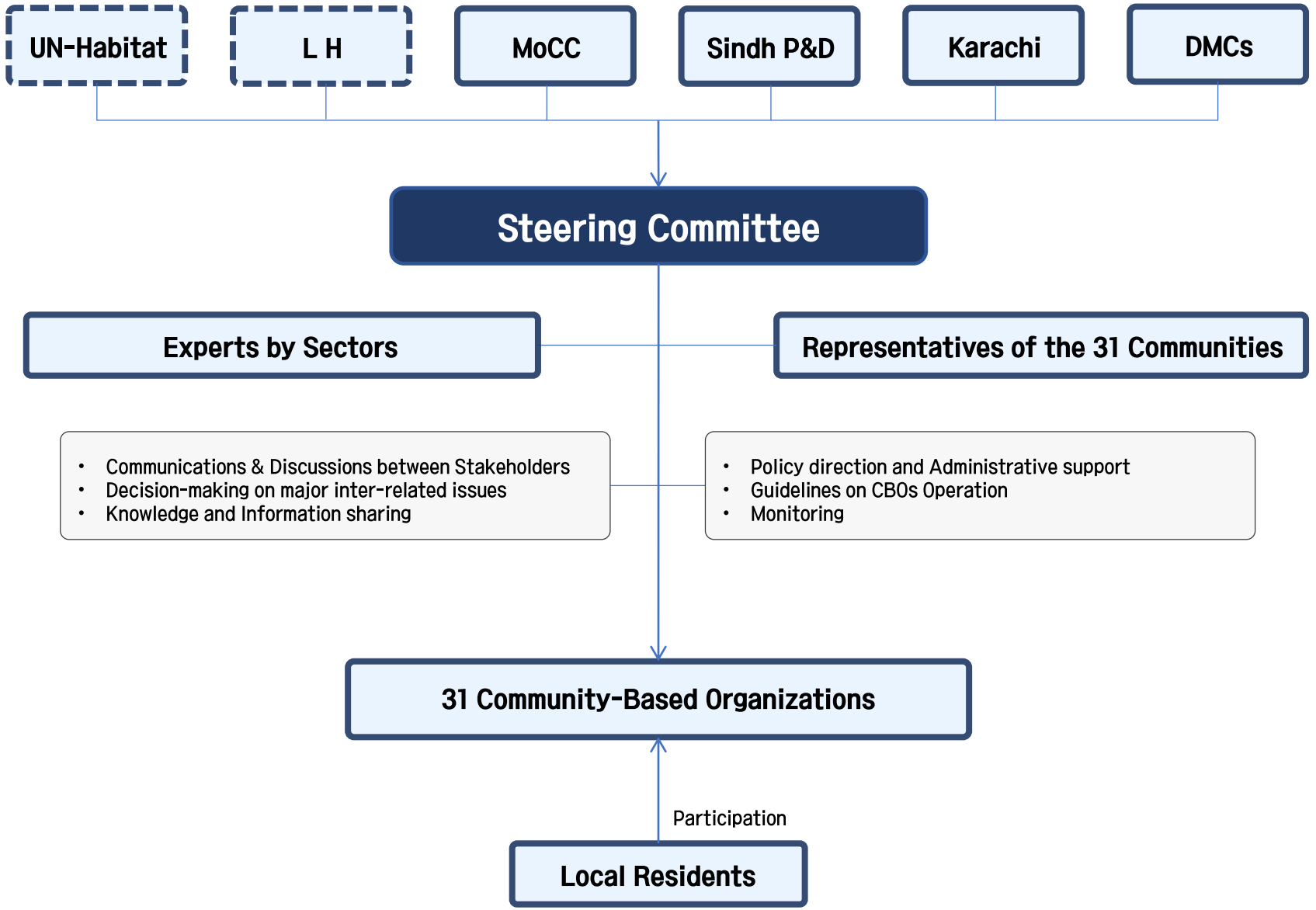


6. Implementation Plan

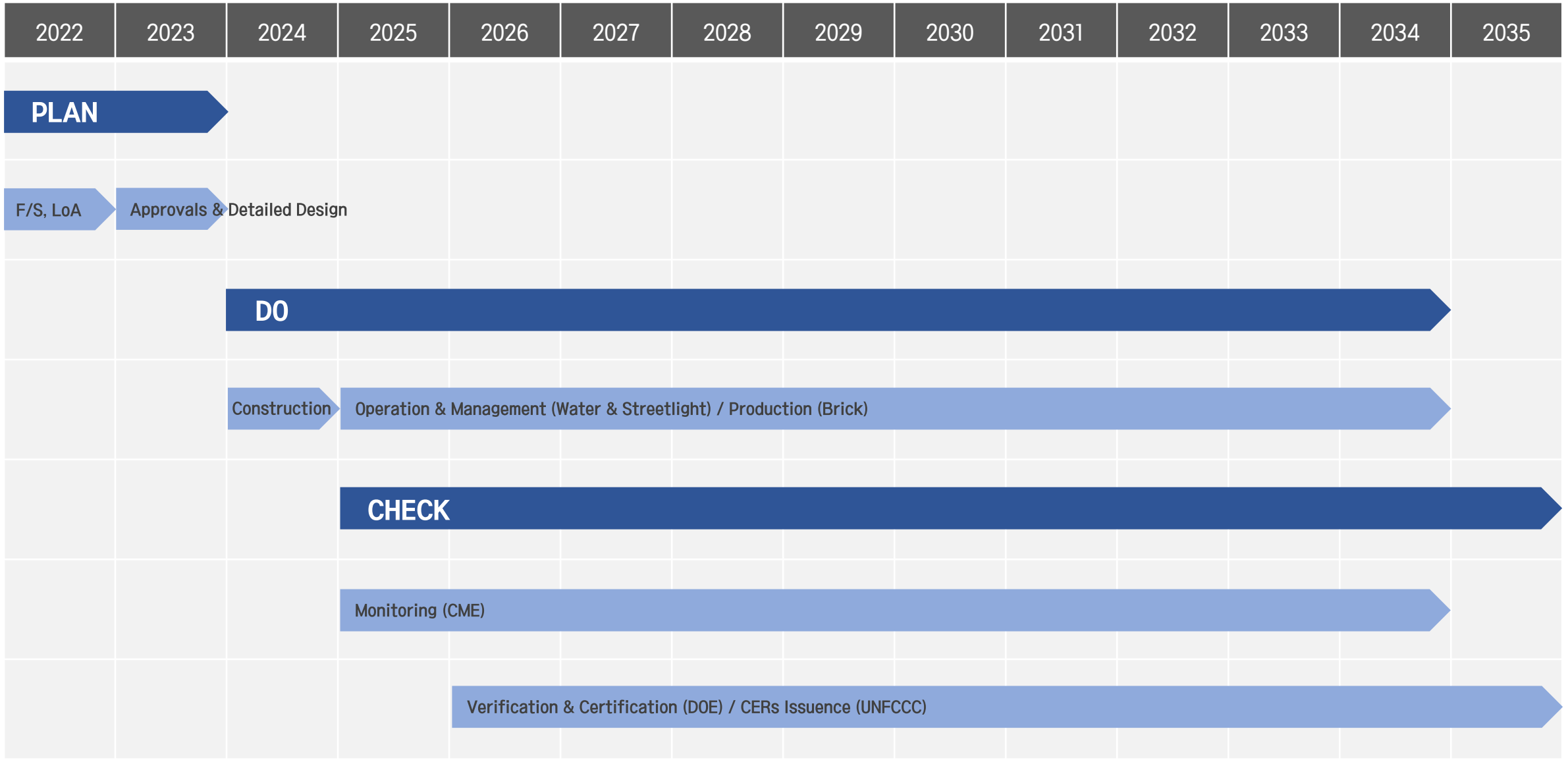
29 Implementation Framework



30 Communication Structure



31 Project Schedule

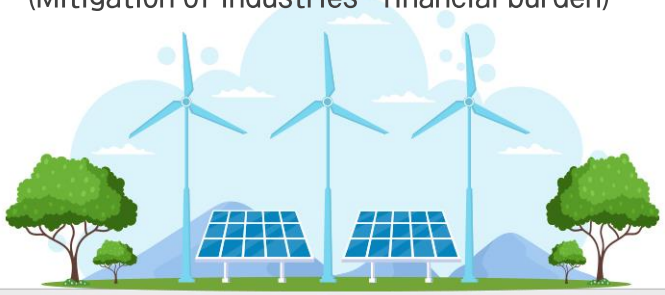


7. Conclusion

32 Benefits

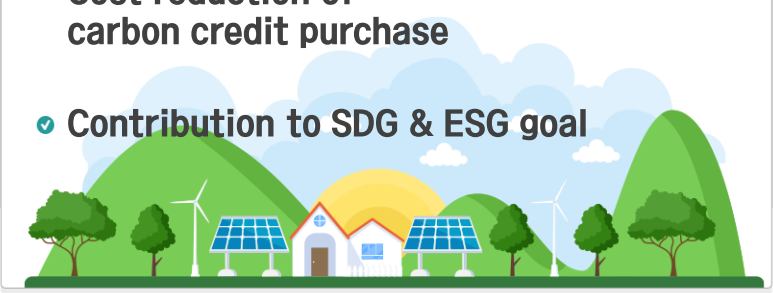
South Korea

- **Contribution to NDC 2030**
- **Stablization of Carbon Credit Market**
  (Mitigation of industries' financial burden)



L H

- **Achievement of LH' s emission reduction target**
- **Cost reduction of carbon credit purchase**
- **Contribution to SDG & ESG goal**



Pakistan

- **Living environment**
  - Housing rehabilitation
  - Developing essential infrastructures
- **Economic development**
  - Business opportunities forlocal industries
  - Job creation (hiring local residents)
- **Social development**
  - Improving safety and reducing crime rates
  - Improving health
  - Gender equality
  - Citizen participation
- **Environmental protection**
  - Improving air quality
  - GHG emission reduction

Sustainable Development Goals (SDG)

6 CLEAN WATER AND SANITATION

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

11 SUSTAINABLE CITIES AND COMMUNITIES

13 CLIMATE ACTION

Sustainable development with GHG emission reduction

THANK YOU

LH Korea Land and Housing Corporation