K-water

Bridging the Financing Gap and Enhancing Community Engagement in Floating Solar PV Development

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K water

1. Korea Water Resources Corporation (K-water)

Status of K-water in the Water Industry

No.1 in Multi-purpose Dam Management, Water Supply, Renewable Energy Generation

No. 1 in Korea
Multi-purpose Dam Management

Flood control amount of 830 times the Seokchon Lake (5.3 billion m^3)

94.3% of national flood control

No. 1 in Korea
Water Supply

Water pipeline that is 3/4 of the circumference of the earth (31,000 km)

30% of national water produced

No. 1 in Korea
Hydro-energy Generation

Renewable energy generation amount (2,913GWh)

Annual use amount of 970,000 households

First in Korea
Smart City

First National Pilot City, Busan Smart City

Initiated on the first village

First in the World
Global Water Industry

Project promoted on the overall process of water circulation

23 projects promoted in 10 countries

2. Carbon Neutrality Business Portfolio

Achieving ambitious 2050 Carbon Neutrality and Contributing National Determined Contribution by

1) Carbon Reduction in water infrastructure + Utilizing Carbon Sink in river basins

2) Diversification of Water-based Renewable energy sources and scale-up

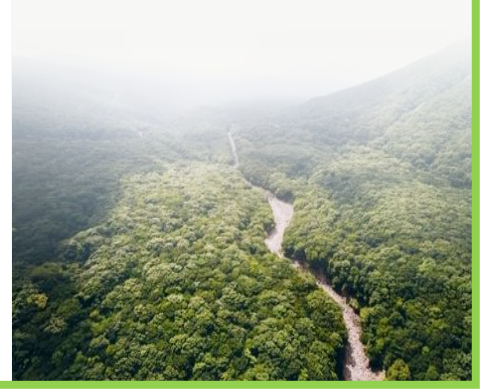
Carbon Reduction + Carbon Offset + Expansion of water-related renewable energy

Low-carbon water management

Low-carbon water supply by energy saving in whole water supply process powered by AI based Energy Management System

Carbon Sink

Eco-friendly carbon neutrality by utilizing Nature based Carbon Sinks



Floating Solar Power

Developing floating solar PV on the unused water surface of large-scale dams and reservoirs

Hydrothermal energy

Combination between Inter-regional water supply pipelines of K-water and cooling systems of buildings

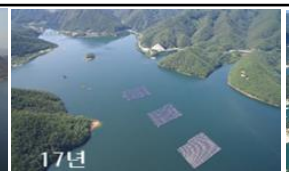
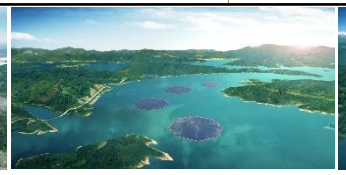
Green Hydrogen

Producing green hydrogen by using renewable energy produced at water energy facilities of K-water

3. State of play of floating solar PV projects

State of Play : K-water Floating Solar PV projects

- Currently operates 6 floating solar PV plants with capacity 58.4 MW
- Developing 5 more plants with capacity 186.7 MW

2012 Operating 2024	Site Picture						
	Project Name	Hapcheon Pilot	Boryeong Pilot	Chungju Pilot #1	Hapcheon SPC #1	Chungju Pilot #2	Yanggu SPC
	Commercial Operation	`12.9	`16.3	`17.12	`21.11	`22.8	`23.10
	Capacity	0.5MW	2MW	3MW	41.5MW	2.6MW	8.8MW
2025 Under Construction and Planed 2030	Site Picture					
	Project Name	Imha SPC	Hapcheon SPC #2	Yongdam SPC	Chungju SPC	Soyang SPC
	Project Period	`22~`25	`21~`25	`23~`25	`22~`26	`21~`27
	Capacity	47.2MW	20MW	20MW	40MW	59.5MW

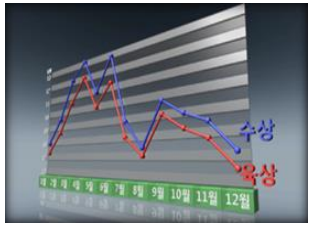
3. State of play of floating solar PV projects

Advantages of Floating Solar than other renewable energy

- Avoiding Land Cost

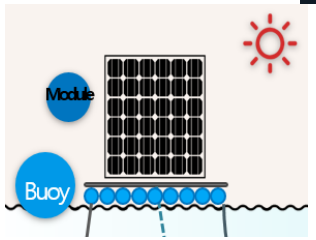
- Efficient Use of Space

- Cooling Effect improves Efficiency



- Synergy with Existing Infra

- Flexibility in Scale, Time Line



4. Financing challenges and Solutions

Financing challenges

- Significant upfront capital requirements and extended return-on-investment timelines
- Constrained fiscal capacity of governments, further stressed by expansive fiscal measures during the global pandemic ☞ Financing gap caused by decreased injection of public and commercial finance
- Distrust and resistance from local communities stemming from perceptions of exclusion in infrastructure developments within their regions ☞ Delay in project commencing and increased financing cost due to prolonged project implementation

Solutions

- Crowd-in private financing by facilitating community participation as investor or lender
  - Adjust cash waterfall putting higher priority on community participatory loan than commercial banks with preferential rate (10%, 4.5% more than 5.5% of PF loan)
  - In-kind support to local stakeholders such as small roof-top solar PV plants, local community center

5. Showcasing K-water projects in Korea

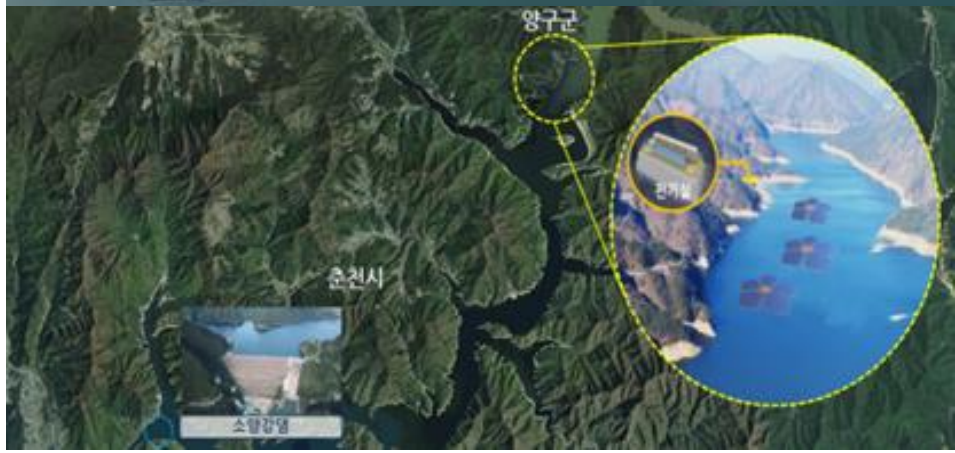
Hapcheon floating solar PV

- Project Cost: $59 Million
- Debt/Equity Ratio: 2:8
  - 80% debt(NH Bank: $14.5 Mil, Samsung Security: $30.3 Mil, Local: $2.4 Mil)
  - 20% equity($11.8 Mil / K-water, Korea Western Power)
- Project Tenure: 20 years
- Generation Capacity: 41 MW, Annual Generation : 56,388 MWh
- Construction Period: Aug 2020 ~ Nov 2021(15 months)

Community Participation

- 1,423 local residents invested $2.4 million USD, earning returns of up to 10% per year
- Government-backed loans helped facilitate this local investment
  - Korean government granted preferential loan to local stakeholders(2.5% interest rate) securing seed money for their investment to Special Purpose Company of this project

5. Showcasing K-water projects in Korea



Yanggu floating solar PV

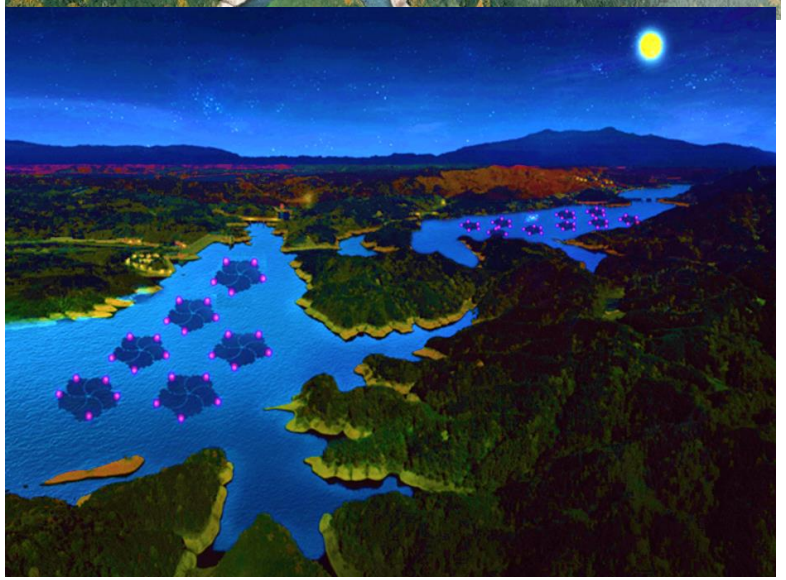
- Project Cost: $12 Million
- Debt/Equity Ratio: 2:8
- - 80% debt($9.6 Mil / KDB: 9.1 Mil, Local: 0.5 Mil Local)
  - 20% equity($2.4 Mil / K-water, Korea East-western Power)
- Project Tenure: 20 years
- Generation Capacity: 8.8 MW, Annual Generation: 11,717 MWh
- Construction Period: April 2023 ~ Oct 2023(6 months)

Community Participation

- 20 local residents invested $0.5 million USD, earning returns of up to 10% per year
- Government-backed loans helped facilitate this local investment

  - Korean government granted preferential loan to local stakeholders(2.5% interest rate) securing seed money for their investment to Special Purpose Company of this project

5. Showcasing K-water projects in Korea



Imha floating solar PV

- Project Cost: $57 Million
- Debt/Equity Ratio: 2:8
  - 80% debt($45 Mil / Hana Bank Consortium: $41.2Mil, Local: $3.8 Mil)
  - 20% equity($12 Mil / K-water, Korea Hydro Nuclear Power)
- Project Tenure: 20 years
- Generation Capacity: 47.2 MW, Annual Generation: 61,563 MWh
- Construction Period: July 2024 ~ July 2025(12 months)

Features including community participation

- 4,500 local residents invested $3.8 million USD, earning returns of up to 10% per year
- Beautifully decorated solar panels in the shape of Mugunghwa(National Flower of Korea) and Taegeukgi(National Flag of Korea) will become one of the major tourist attractions in the region

6. Lessons learned

Immense importance of community buy-in

- Acceptance of local communities are critical for project commencing especially local residents feel they are excluded from direct/indirect benefit of energy infrastructures

☞ Value of swift project implementation outnumbers the cost of profit sharing with local stakeholders

Detailed Environmental Impact study for community buy-in

- People mind potential side-effect on water quality, eco-diversity
- Extensive environmental Impact study mitigates backlash from local stakeholders

☞ Easing public concern about environmental safety is a key to facilitate local community participation

Blended finance for project viability

- Blending public and private capital through Special Purpose Companies is essential for financing large-scale renewable energy projects

☞ Potential source to fill financing gap and raise public acceptability on energy projects

7. The Way forward

Keen to collaborate with Asian neighbors

- (As-Is) All floating solar PV plants of K-water are placed within South Korea
- (To-Be) Disseminating our business model with Asian countries

Contribution for just transition of Korea and Asian developing countries

- Contributing achievement of NDCs of Korea and project partners at the same time through mutually beneficial ties
- Open for any collaborations with all developing countries in the world

Seeking synergy with ESG and Climate fund for scale-up

- Hoping to further collaboration with ESG and Climate fund for bigger project while contributing climate change mitigation

Thank you

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