

SUMMARY OF INITIAL IMPLEMENTATION RESULTS OF THE ECO-INDUSTRIAL PARK PROJECT IN HIEP PHUOC IP, AMATA IP, DEEP C IP

Le Xuan Thinh
VNCPC

1. Capacity development workshop on resource efficiency and cleaner production and industrial symbiosis

VNCPC collaboration with PMU, UNIDO organized 8 training sessions on capacity building on cleaner production resource efficiency and industrial symbiosis for 03 industrial zones, including:

- Deep C IP (Hai Phong);
- Amata IP (Đồng Nai);
- Hiệp Phước IP (Tp. Hồ Chí Minh).



2. Assessment on resource efficiency cleaner production and industrial symbiosis at the enterprise

During the project implementation period, the project implementation team met **119** enterprises, persuaded **49** enterprises to participate in the project, and implemented the first mission of assessment for **41** enterprises.

Table 1. Summary of RECP assessment activities at enterprises

Industrial park name	Number of enterprises registered to participate in the project as required by UNIDO	Number of businesses that the project team has met	Number of businesses registered to participate in the project	Number of businesses that have assessed RECP
Deep C IP (Hai Phong City)	20	30	15	15
Amata IP (Dong Nai)	20	30	12	10
Hiep Phuoc (Ho Chi Minh City)	40	59	22	16

2. Assessment on resource efficiency cleaner production and industrial symbiosis at the enterprise

There have been **49** enterprises registered to participate in the project.

In which, **41** enterprises have been assessed RECP.

Total number of RECP solutions recommended:

196 Solutions

Total savings potential: 151.44 billion VND

Reduce consumption

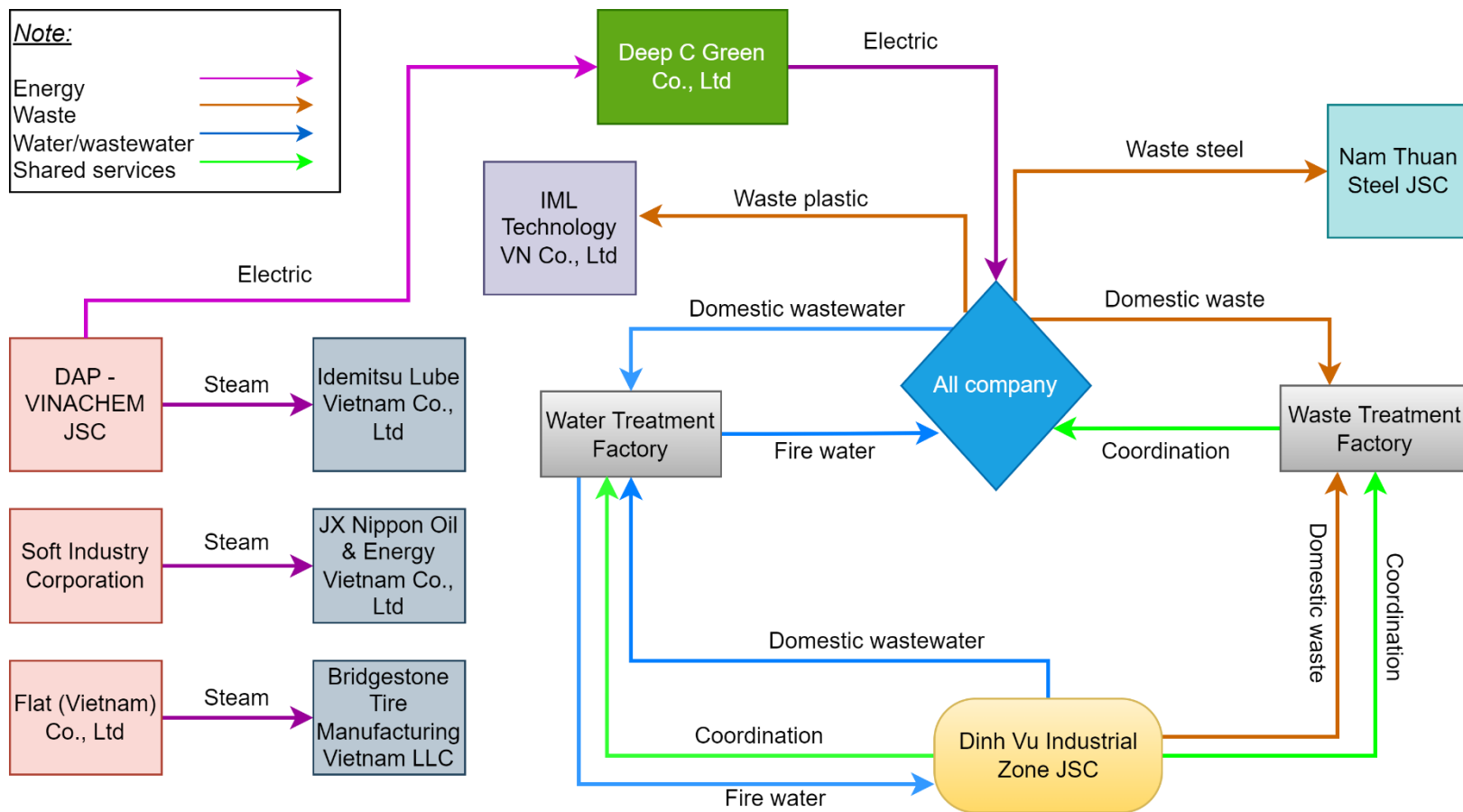
- Electricity: **64,195.5** MWh/year.
- Water: **77,896.4** m³/year
- Fuel:
 - DO Oil: **33,6** tons/year.
 - LPG: **132,1** tons/ year

Emission reduction:

GHG: **55,211.95** tons of CO₂ eq/year.

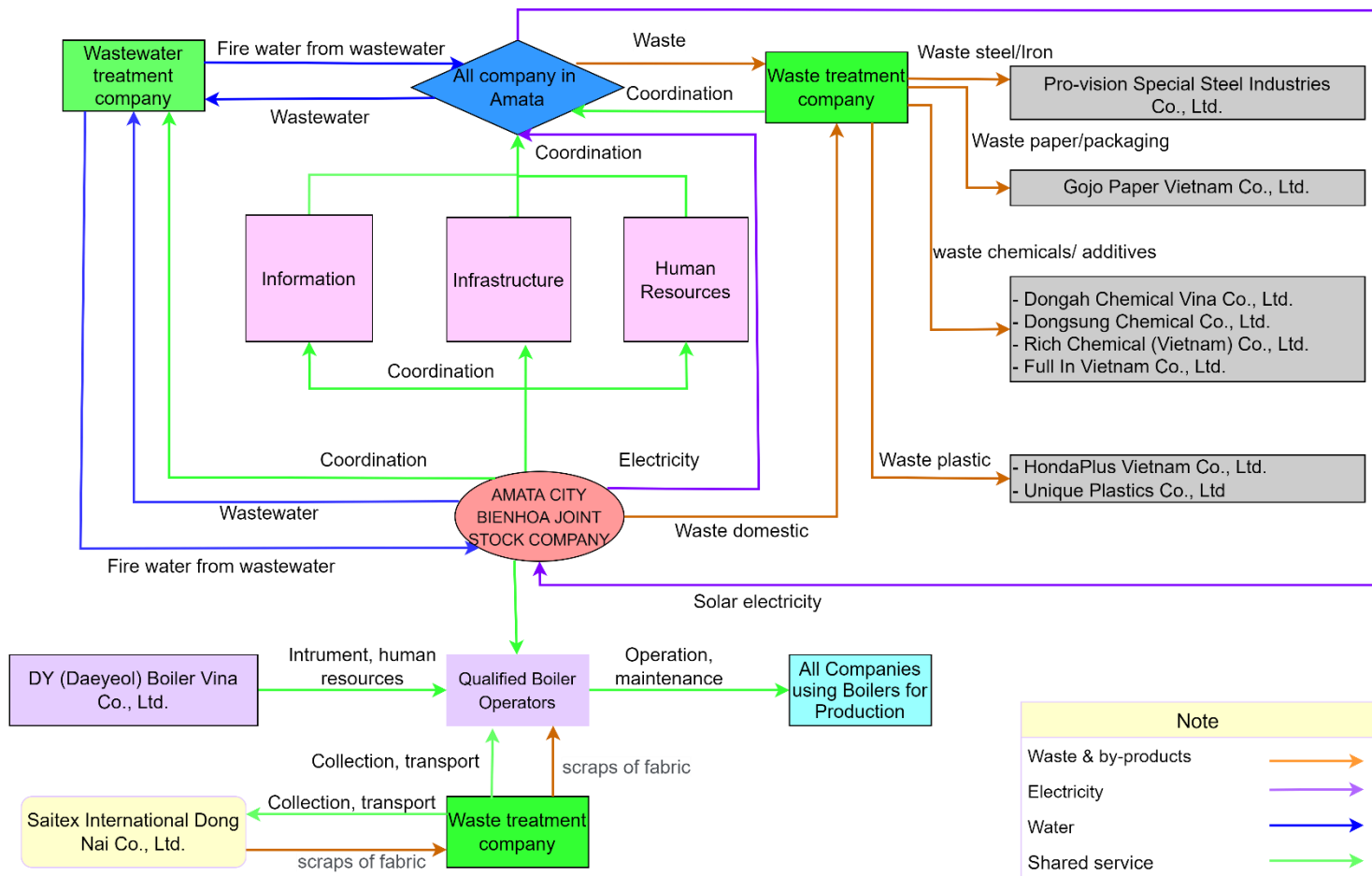
3. Result of the idea of industrial symbiosis

Deep C IP



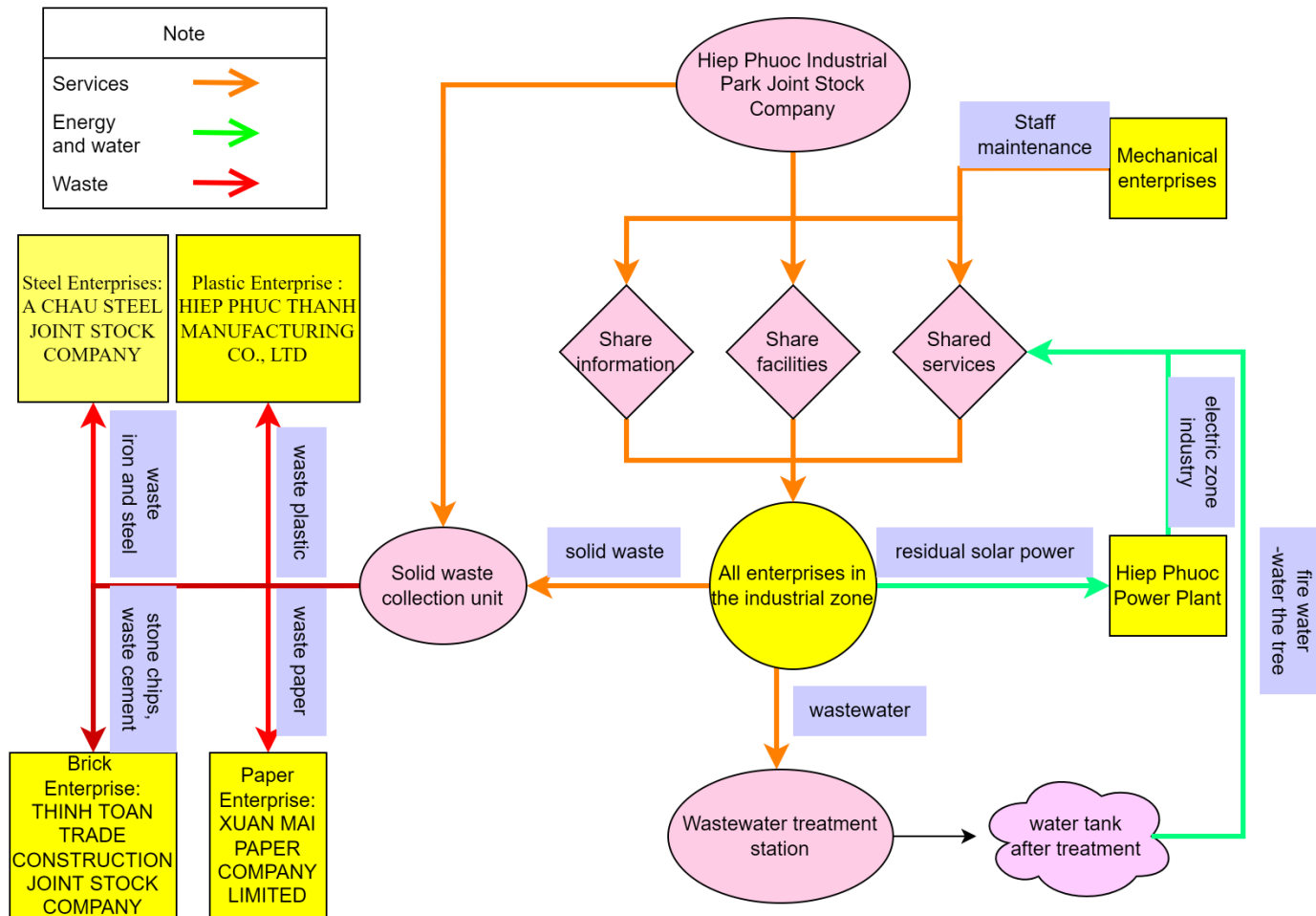
3. Result of the idea of industrial symbiosis

Amata IP



3. Result of the idea of industrial symbiosis

Hiep Phuoc IP



4. The result of the idea of industrial-urban symbiosis

Deep C IP

The meeting was held with the participation of: PMU, VNCP, Developer of Deep C Industrial Park: **6 solutions** proposed.



Research meeting on symbiosis of Deep C industrial park - Hai Phong and urban area.

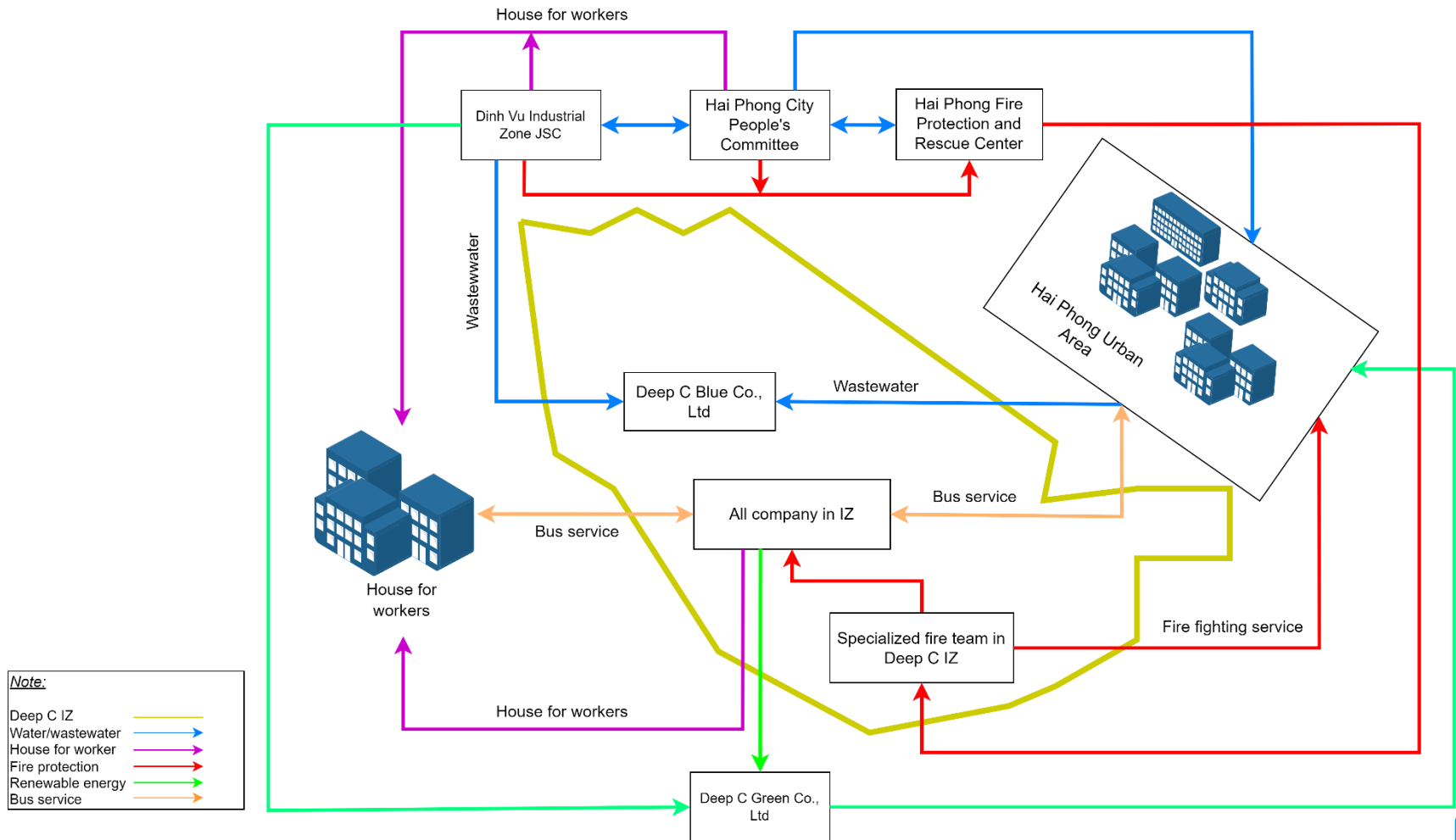
4. The result of the idea of industrial-urban symbiosis

Deep C IP

No	Options	Priority level	Stakeholders
1	Bus service to transport workers for companies in Deep C Industrial Park	1	Deep C, Tenant; Bus transportation company
2	Hai Phong city builds social housing for workers in Deep C Industrial Park and low-income people.	3	Deep C, Heza, Hai Phong City
3	Deep C Blue Co., Ltd. receives and treats domestic wastewater from Hai An district - Hai Phong city	4	Deep C, Heza, Hai An District, Hai Phong City
4	Developing renewable energy for companies in Deep C Industrial Park. Deep C Green Co., Ltd. collects excess electricity and supplies it to urban areas and companies in need.	6	Deep C, tenant, Hai Phong Electricity One Member Co., Ltd.
5	Deep C development stands out to collect waste for companies in the industrial park.	5	Deep C, tenant, URENCO.
6	Deep C Industrial Park shares firefighting services with Hai An district- Hai Phong city	2	Deep C, Hai Phong City, Heza

4. The result of the idea of industrial-urban symbiosis

Deep C IP



4. The result of the idea of industrial-urban symbiosis

Amata IP

The meeting was held with the participation of: PMU, VNCPC, Developer of Amata Industrial Park: **7 solutions** proposed.



Research meeting on symbiosis of Amata industrial park – Dong Nai and urban area.

4. The result of the idea of industrial-urban symbiosis

Amata IP

No	Options	Priority level	Stakeholders
1	Building daycares for workers of Amata Industrial Park and neighboring residents	4	Amata IP Developer, Bien Hoa City, Investor
2	Collect Biomass from tree trimming and waste sludge make composting	3	Amata IP Developer, DIZA
3	Reuse wastewater after treatment to watering plants in the industrial park and surrounding urban areas	2	Amata Ip Developer, tenant, Dong Nai Urban Environment Service One Member Company Limited
4	Developing renewable energy for companies in Amata Industrial Park. Amata power collects excess electricity and supplies it to urban areas and companies in need.	1	Amata IP, teanant, Amata power
5	Amata Industrial Park shares firefighting services with Bien Hoa city and neighboring industrial zones		Implemented
6	Vocational training, job introduction service for enterprises in industrial zones		Implemented
7	Construction of shared service infrastructure: squares, commercial centers,...		Implemented

4. The result of the idea of industrial-urban symbiosis

Hiep Phuoc IP

The meeting was held with the participation of: PMU, VNCP, Developer of Hiep Phuoc Industrial Park: **7 solutions** proposed.



Research meeting on symbiosis of Hiep Phuoc Industrial Park – Ho Chi Minh City and urban area.

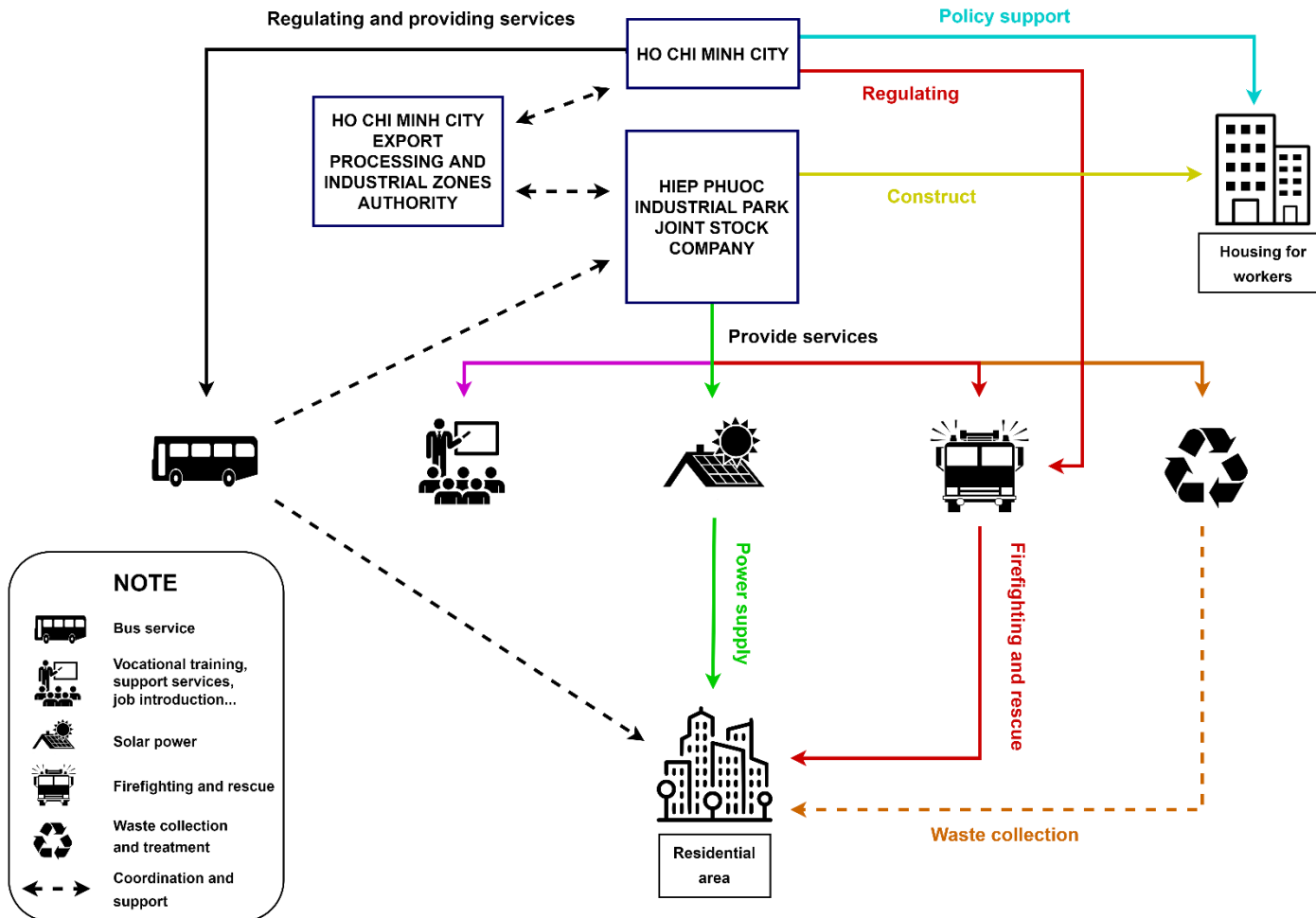
4. The result of the idea of industrial-urban symbiosis

Hiep Phuoc IP

No	Options	Priority level	Stakeholders
1	Bus service to transport workers for companies in Hiep Phuoc Industrial Park	3	Hiep Phuoc IP Developer, HEPZA
2	Building social housing for workers and low-income people	1	Hiep Phuoc IP Developer, HEPZA, Ho Chi Minh City
3	Hiep Phuoc Developer stands to collect waste for companies in the industrial park.	1	Hiep Phuoc IP Developer, HEPZA, Ho Chi Minh City
4	Reuse wastewater after treatment to watering plants for industrial parks and urban areas.	2	Hiep Phuoc IP Developer, URENCO, tenant
5	Developing renewable energy for companies in Hiep Phuoc Industrial Park. Hiep Phuoc power collects excess electricity and supplies it to urban areas and companies in need.	4	Hiep Phuoc IP Developer
6	Hiep Phuoc Industrial Park shares fire fighting services with neighboring cities		Đã triển khai
7	Vocational training, service, job introduction for enterprises in the industrial park		Đã triển khai

4. The result of the idea of industrial-urban symbiosis

Hiep Phuoc IP:



5. Case study of the idea of industrial symbiosis

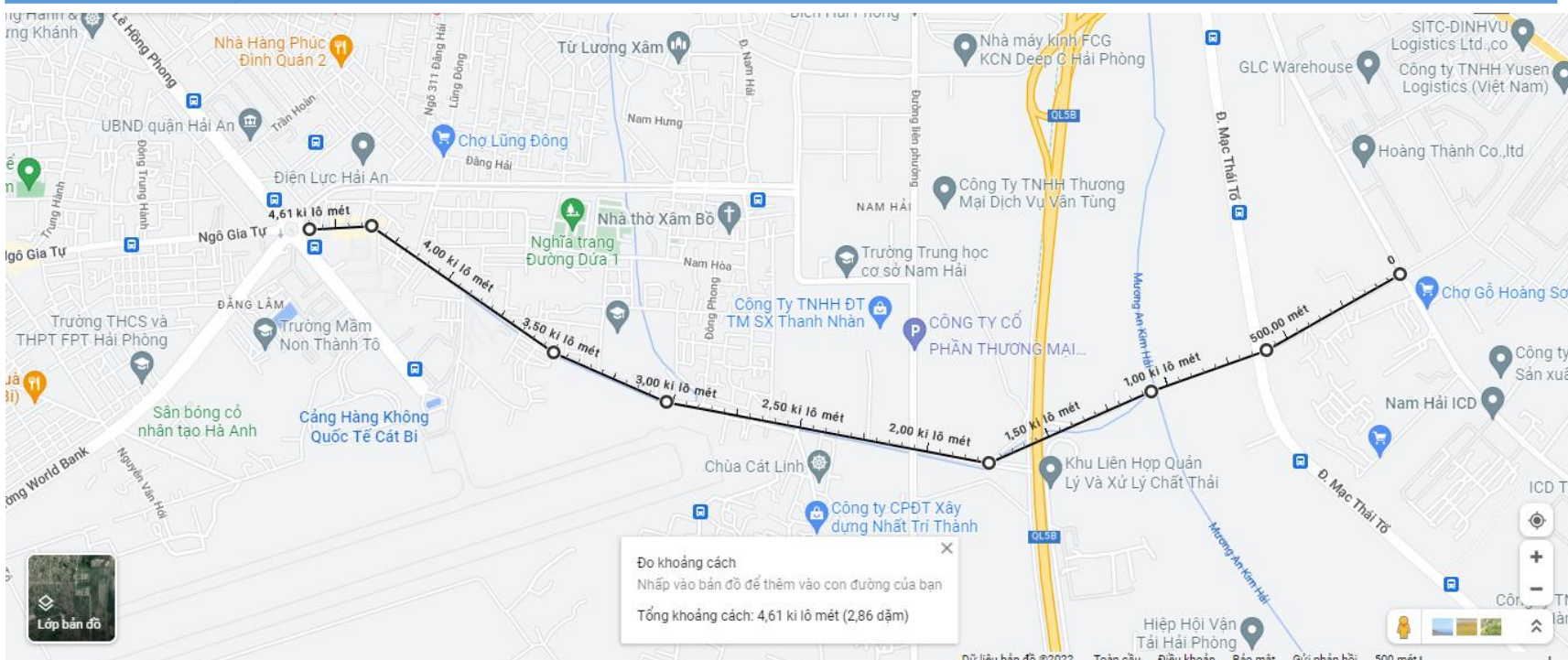
Opportunity 1. The wastewater treatment plant of Deep C Industrial Park collects, receives and treats domestic wastewater from Hai An district - Hai Phong City

<p>Brief description of current situation</p>	<ul style="list-style-type: none"> ▪ Hai An district has an area of 103.7 km², population in 2019 is 132,943 people, and population density reaches 1,282 people/km². It is estimated that the daily-life wastewater of households in the Hai An district is about 15,953 m³/day. ▪ Currently, domestic wastewater from households in the Hai An district is discharged into the city's drainage system. This system runs along the main streets. The city does not have a system of pipes to carry domestic wastewater separate from rainwater runoff ▪ The wastewater treatment plant of Deep C Industrial Park is operating with a capacity of 1200 m³/day, the designed capacity of phase 1 is 6000 m³/day, phase 2 is 6000 m³/day (not yet built). <p>=> The wastewater treatment plant of Deep C Industrial Park can receive domestic wastewater from Hai An district for treatment, with a receiving capacity of 4,500 m³/day – 10,800 m³/day.</p>
<p>Relevant stakeholders</p>	<ul style="list-style-type: none"> ▪ Hai Phong City People's Committee: Project Coordinator; ▪ Dinh Vu Industrial Park Joint Stock Company (Deep C Industrial Park Developer); ▪ Hai Phong Sewerage and Drainage One Member Limited

Technical feasibility

Intervention description

- Phase 1: Building a system to collect domestic water for treatment at the wastewater treatment plant of Deep C Industrial Park. The estimated length of the collection pipeline is 4.61 km.
- Phase 2: Building a domestic wastewater collection system separating domestic wastewater and overflowing rainwater for Hai An district.
- The wastewater treatment plant receives domestic wastewater from Hai An district and operates the wastewater treatment system.



Technical feasibility

Ease of technical implementation

Policies of Hai Phong city and Deep C Industrial Park about:

- Hai Phong City agree to allow the connection of domestic wastewater in Hai An district, connection to the wastewater treatment plant of Deep C Industrial Park;
- Deep C Industrial Park agrees to receive and treat domestic wastewater of Hai An district;
- Hai Phong city agrees to invest in a system of collecting and connecting domestic wastewater to the Deep C Industrial Park wastewater treatment plant;
- Hai Phong city pays operating and domestic wastewater treatment costs for Deep C Industrial Park.

This solution will lead to some changes in the infrastructure of the industrial park, and the infrastructure of Hai Phong city (as mentioned above). It is possible to disrupt travel activities in industrial parks and residential areas during construction and installation.

Besides:

- Hai Phong Drainage Company has a lot of experience in the field of design and construction of the drainage system of Hai Phong City.
- Deep C Industrial Park has a large-scale wastewater treatment system and skilled and experienced water treatment plant operators.

Some initial preliminary results of the project

Economic Feasibility

Economic Criteria	Estimated Value	Key sources / assumptions
CAPEX	NA	NA
OPEX	NA	NA
Revenues/Savings	<ul style="list-style-type: none"> Unavailable 	<ul style="list-style-type: none"> Unavailable
IRR	<ul style="list-style-type: none"> Unavailable 	<ul style="list-style-type: none"> Unavailable
NPV	<ul style="list-style-type: none"> Unavailable 	<ul style="list-style-type: none"> Unavailable
Payback period	<ul style="list-style-type: none"> Unavailable 	
Possible financing sources	<ul style="list-style-type: none"> Local budget 	

Environmental and Social Aspects

	Short description	Quantification / qualification
Enviromental benifit	Impact on resource consumption/energy savings	The wastewater treatment plant will reduce the consumption of electrical and chemical energy for a unit of wastewater to be treated
	Impact on emissions (inc. POP)	<p>Reduce the amount of untreated domestic wastewater discharged into the environment.</p> <p>Increase the amount of sludge from the water treatment process at the Deep C Industrial Park wastewater treatment station.</p> <p>Reducing the pressure of wastewater treatment for the city's wastewater treatment plant</p>
	Impact on water consumption	If the price of wastewater treatment is included in the purchase price of water for domestic use, people's awareness of economical and efficient use of water will increase.

Environmental and Social Aspects

	Short description	Quantification / qualification
Social benefits	Impact on employees (working environment)	
	Job creation	Create more jobs for workers
	Organisational and technical capacity building	
	Impact on neighbouring communities	Improve living environment, reduce odor, improve people's health

Governance and Legal Aspects

	Enablers and Incentives	Challenges
Governance and management of IS opportunity		Long-term commitment between stakeholders
Legal aspects in relation to IS opportunity		Decision 626/QD-UBND in 2018 approving the wastewater drainage planning of Hai Phong city to 2025, vision to 2050

5. Case study of the idea of industrial symbiosis

Opportunity 2: Deep C Industrial Park shares fire service with Hai An district- Hai Phong city

<p>Status</p>	<ul style="list-style-type: none"> • Hai An district has an area of 103.7 km², population in 2019 is 132,943 people, population density reaches 1,282 people/km². Due to the high population density, Hai An district is one of the central districts of Hai Phong, so fires and fires may occur. • Previously, Hai An district had many big fires such as: Big fire at plastic warehouse Phu Lam Plastic Co., Ltd., located at 1356 Nguyen Binh Khiem, Dong Hai 2 ward, Hai An district; On May 28, 2022, a house fire broke out at 80A/253 Bui Thi Tu Nhien, Hai An district,... • Hai Phong city has fire prevention and fighting teams concentrated mainly in the city center (as shown in the diagram below). Once a fire alarm occurs in a densely populated area far from the city center, it takes a long time for the fire department to travel from the headquarters to the fire alarm point. • On the other hand, Deep C Industrial Park has a specialized fire protection team: 3 dedicated fire engines, 19 firefighters who are always ready to perform their duties..
----------------------	--

The specialized fire prevention and fighting team of Deep C Industrial Park can participate in fire fighting and receive dispatch from the fire prevention and fighting center of Hai Phong city. The time it takes for the team's fire trucks to reach some densely populated areas in Hai An district will be faster than that of the fire trucks moving from the city center.

Technical feasibility

<p>Description of the intervention</p>	<p>Develop a mechanism to identify fire alarm locations and coordinate firefighting forces accordingly. In case of need, it is possible to coordinate the fire prevention team of Deep C Industrial Park to participate in fire fighting activities</p>
<p>Factors that ensure success</p>	<ul style="list-style-type: none"> • Policies to encourage fire prevention and fighting forces in industrial zones and Hai Phong city: • Hai Phong City: <ul style="list-style-type: none"> - Agree with the proposed solution; - Ready to share costs with Deep C Industrial Park; • Deep C Industrial Park agrees: <ul style="list-style-type: none"> - Sharing fire protection services; - Receiving and processing fire alarm information from Hai Phong city coordination center; • This solution will lead to some changes in the coordination mechanism of firefighting forces;

Economic Feasibility

Evaluation Criteria	Estimate value	Các nguồn/ giá định chính
CAPEX - Investment cost	NA	NA
OPEX- Investment cost	NA	NA
Revenue	• NA	• NA
IRR	• NA	• NA
NPV - Net Present Value	• NA	• NA
Payback period	• NA	
Financial sources		- NA

Environmental and Social Aspects

	Brief description	Quantity, Quality
Environmental benefits	NA	NA
Social benefits	Impact on employees (working environment)	Creating a new working environment for the fire prevention team of Deep C Industrial Park
	Create more jobs	Create more jobs for officers of the fire prevention team in Deep C Industrial Park.
	Improve organizational and technical capacity	Improve the capacity of receiving, handling and coordinating the fire force of the Hai Phong City Fire Prevention and Search and Rescue Center and the Fire Prevention of Deep C Industrial Park
	Impact on nearby communities	

Environmental and Social Aspects

	Incentives, support	Challenges
Governance and management of IS opportunity		Long-term commitment among stakeholders
Legal related to industrial symbiosis opportunity		NA

In fact, this model has also been successfully deployed in Hiep Phuoc Industrial Park - Ho Chi Minh City

- Many technical regulations and standards are not clear and unified: solar energy, water recycling for watering plants, ...
- It requires active coordination and support from state management agencies, public utility companies to create effective service symbiosis: bus service,...
- There should be synchronous coordination between ministries, departments and sectors to remove legal barriers and create a safe corridor to encourage businesses, industrial zones to cycle, recycle, reuse and symbiosis in place

A bouquet of flowers, including a large pink dahlia and smaller white and pink flowers, is arranged on a rustic wooden surface. A brown paper tag with a hole and a string is attached to the bouquet. The tag has the words "Thank you!" written in a cursive font.

Thank
you!