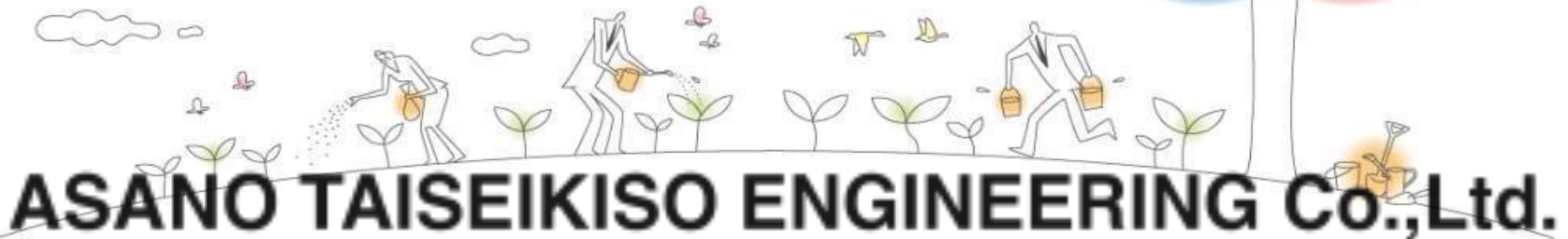
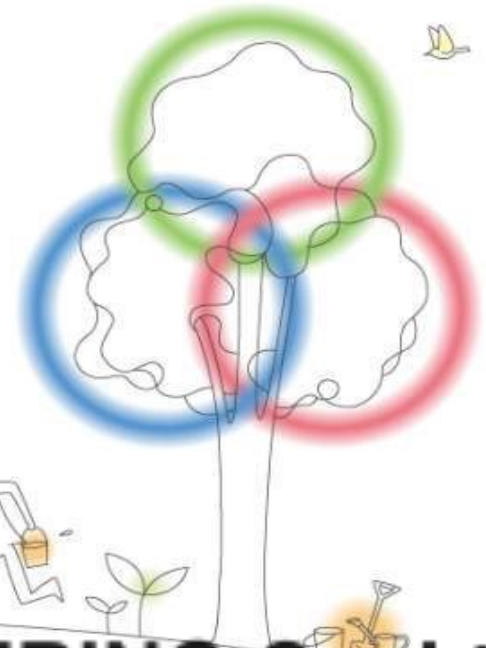


# Development of Clean Cooling and Heating System by Utilization of Unused Wastewater in Vietnam



*TSUYOSHI SHIGA*



# Contents

- 1. Background**
- 2. Outline of Installed System**
- 3. Future Prospect / Challenge**

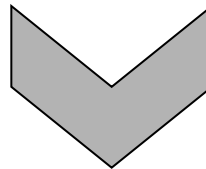
# 1. Background

## ■ Energy Status

- ✓ **Energy consumption growth in Vietnam**
- ✓ **Plenty of Unused thermal energy in industry (ex. Manufacture)**

## ■ Technology Development

- ✓ **Environmentally-Tough & High-Efficient Heat Exchanger, " G-Hex"**
- ✓ **Applied & verified in Groundwater, Hot spring, in Japan**

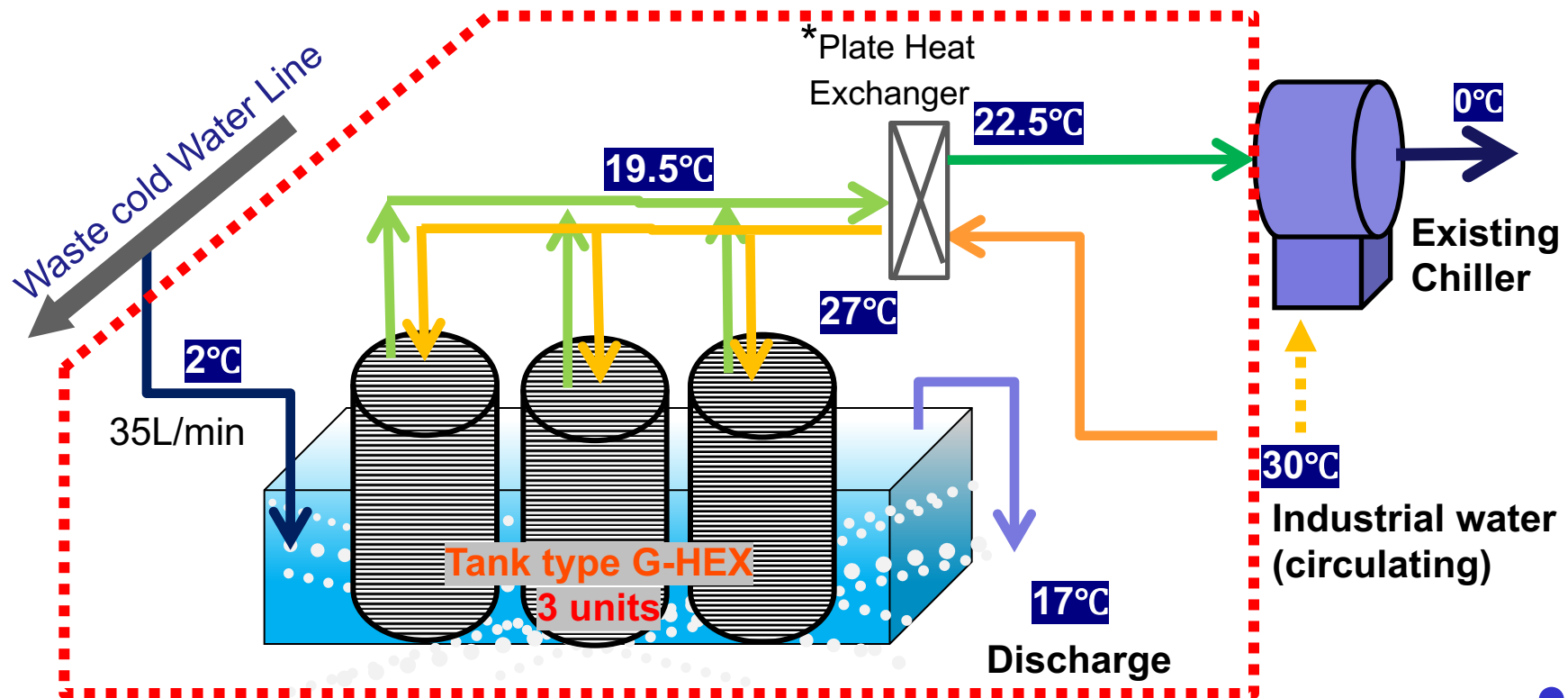


**Application Challenge for  
Manufacture in Vietnam  
for Energy Saving & CO2 Reduction**

## 2. Outline of Installed System

### ■ Proposed System

- ✓ **Chicken Processing company is discharging Cold water (2 °C)**
- ✓ **Wastewater contain fat, meat-fragment, feather etc.**
- ✓ **Conventional “Metal” Heat Exchanger won’t work**

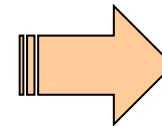
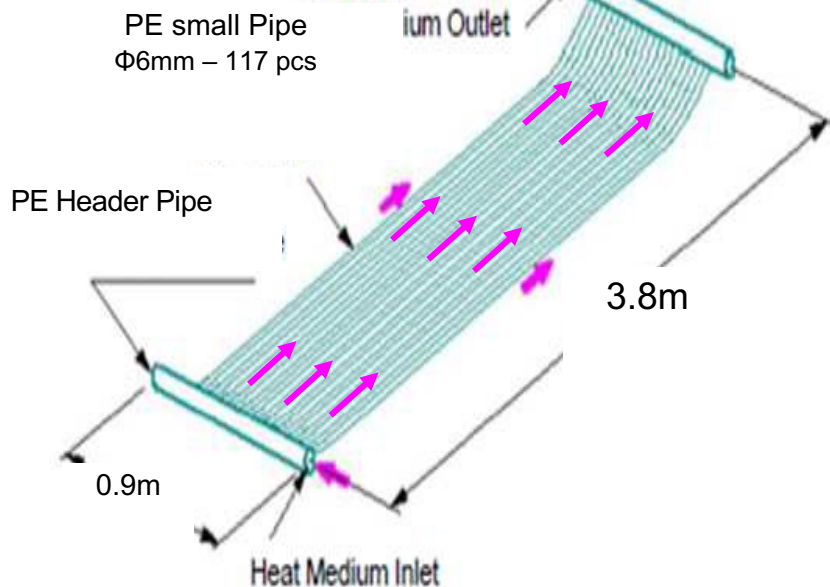


## 2. Outline of Installed System

### ■ Proposed System

- ✓ Highly Efficient Heat Exchange
- ✓ No corrosion and rust by wasted water
- ✓ 50 years durability (made of Poly Ethylene Resin)

#### P.E. Heat Exchanger (G-Hex)

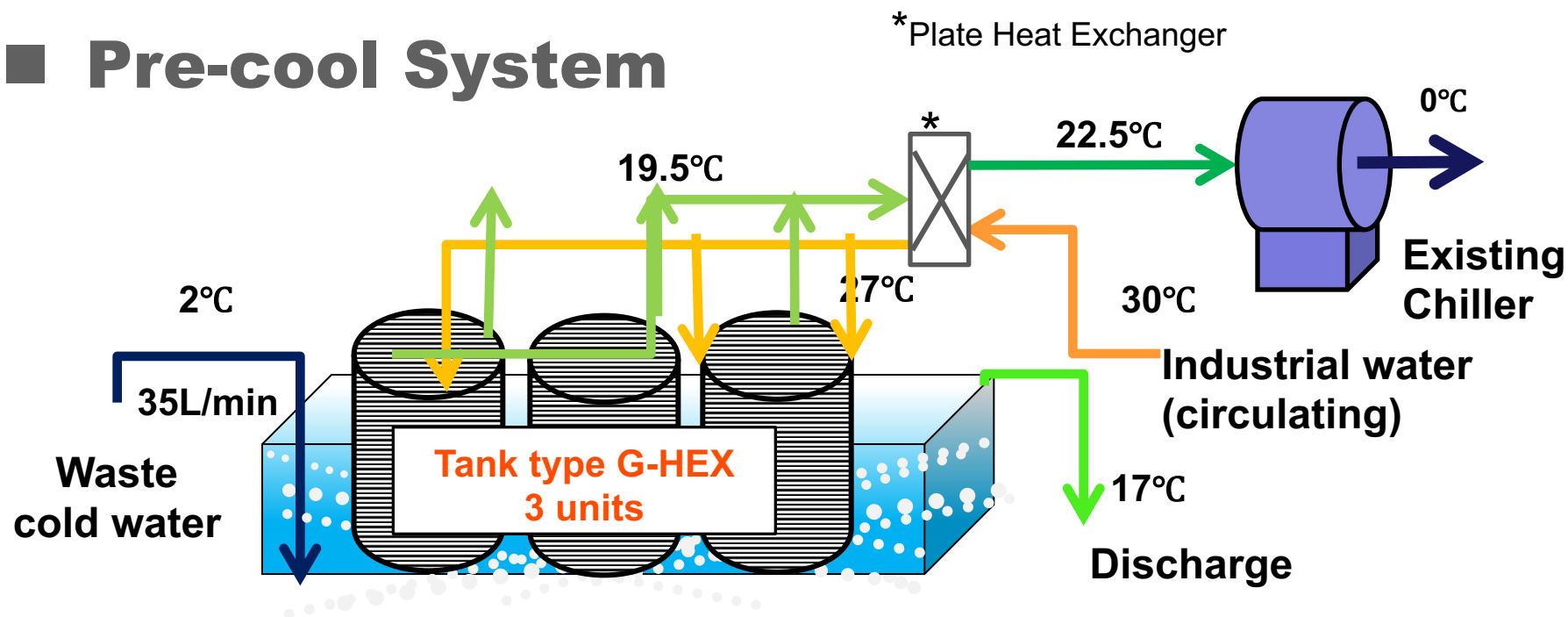


**Roll up**



## 2. Outline of Installed System

### ■ Pre-cool System



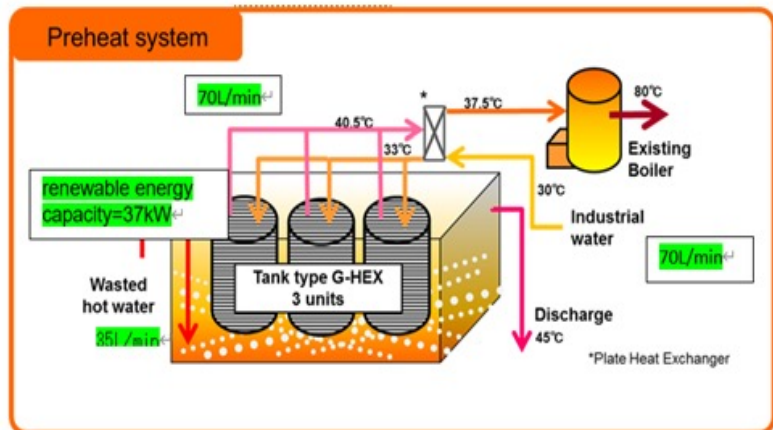
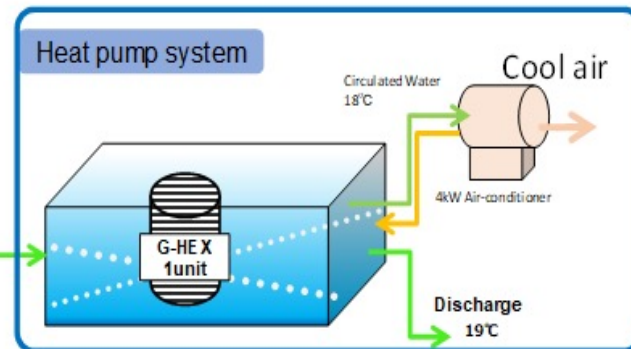
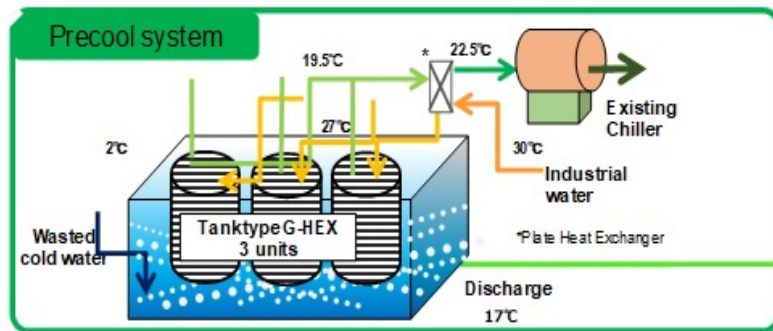
Project location	Chicken processing factory in Hanoi, Vietnam		
Initial cost	45,205 USD	Cost Advantage	10,684 USD/year
CO2 reduction	119 t-CO2/year		

# 3. Future Prospect / Challenge

## ■ Pre-Cool & Pre-Heat & Air Conditioning

Full Scale (Precool + Preheat)

Grant Project (Precool)



➤ **Pre Cool : 30 °C to 22.5 °C**

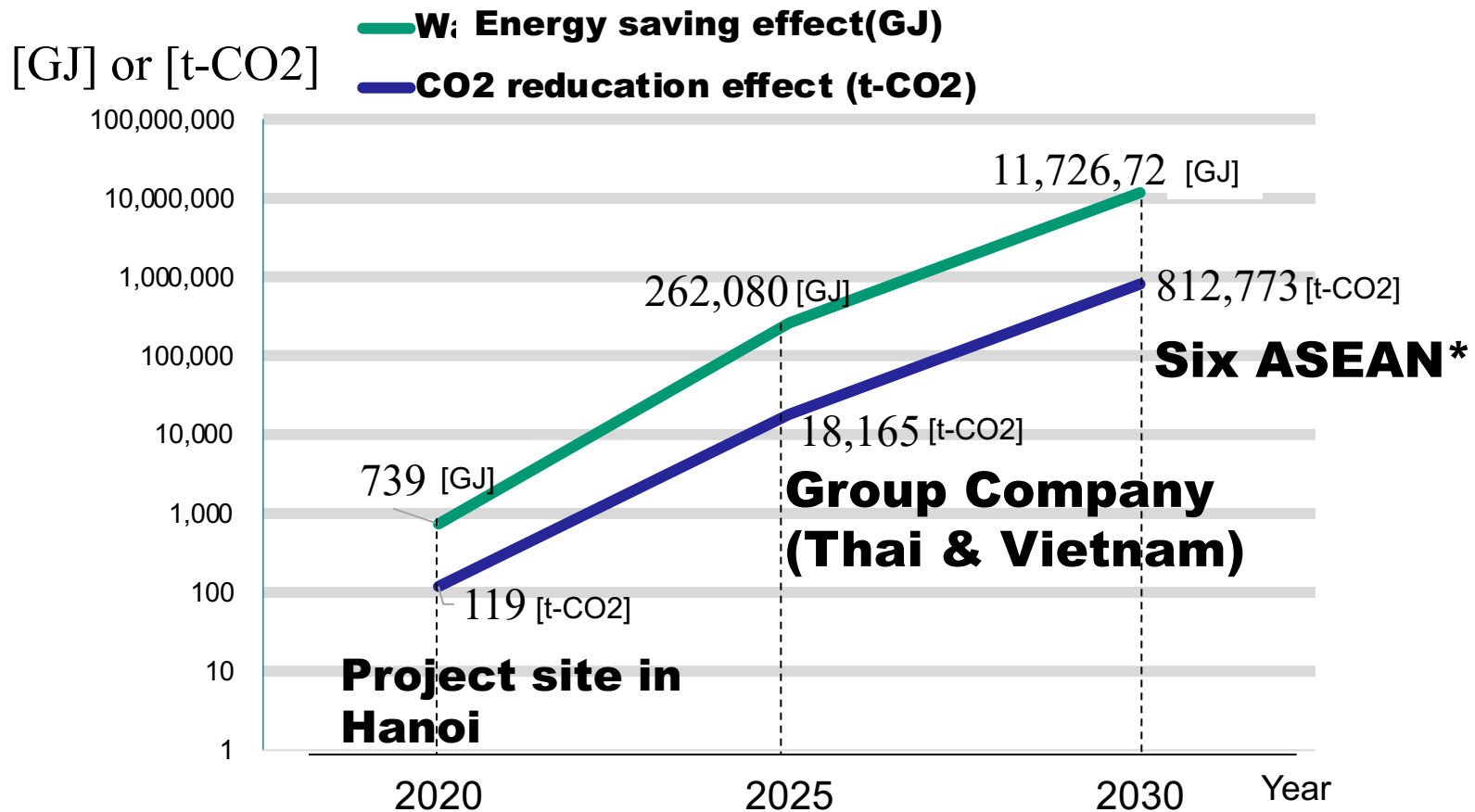
➔ **24 % Electricity Reduction**

➤ **Pre Heat : 30 °C to 37.5 °C.**

➔ **15% Fuel Reduction**

➤ **Plus : Air Cond. for Room cooling**

# 3. Future Prospect / Challenge



\*Vietnam, Singapore, Malaysia, Indonesia, Philippines, and Thailand

Reduce 11.727TJ / year and 810,000t-CO2 / year  
in ASEAN region in 2030



**Thank you for your attention!**

