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# Betagro NH<sub>3</sub>/CO<sub>2</sub> Cold Storage Project in Thailand

By

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**Betagro Group**

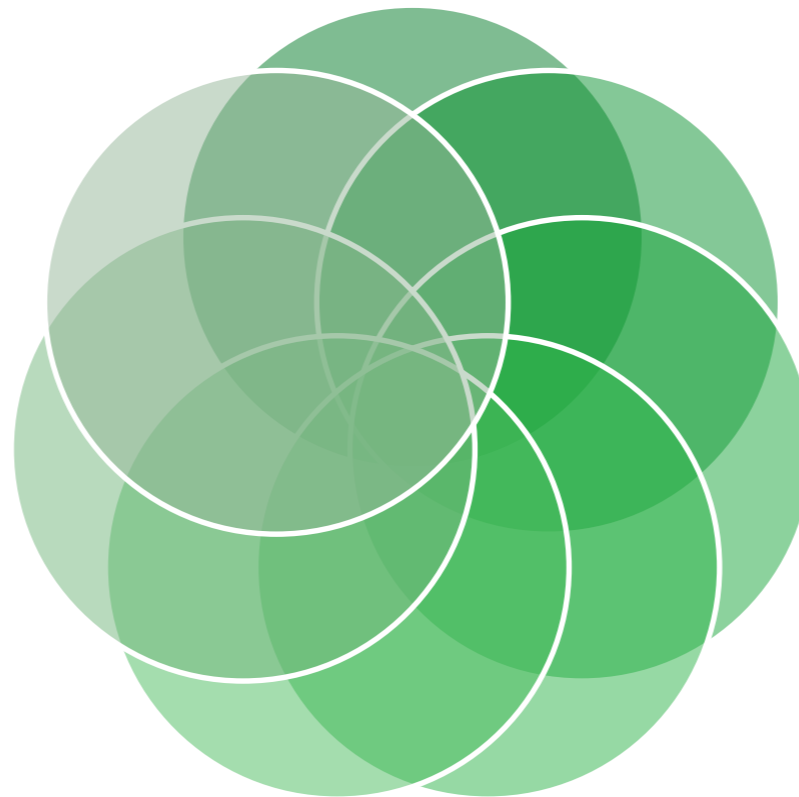
**Second largest  
integrated  
agricultural and food  
industry in Thailand**

**Sale income about  
2,800M us\$/year**

**A group of 37  
medium/large  
companies**

**Customer in 20  
countries**

**Many joint ventures  
with food  
companies in Japan**



**45 factories in  
Thailand**

**10,000 staff/23,000  
worker world wide**



**S-Pure  
(Egg)**



**S-Pure  
(Pork)**



**S-Pure  
(Chicken)**



**World's first  
NSF  
Certificate for  
antibiotic-free  
chicken meat**

## THE SUSTAINABLE **WAY** FOR LIFE



### “ETHICS” COMMITMENT

in business is Betagro's top priority from Day One.

- Business Integrity
- Law Compliance
- Ethical Supply Chain
- Truthful Marketing

Betagro places great importance on **SOCIAL AND EMPLOYEE ENGAGEMENT.**



- Happy & Healthy Employee
- People Development
- Social Investment Programs
- Knowledge Transfer to Community



All of activities in our business are grounded with

### ENVIRONMENTAL CONSCIOUSNESS.

- Carbon Reduction
- Waste Minimization
- Energy Saving
- Eco-efficiency Production



Betagro earns trust and confidence from consumers for its **“QUALITY” EXCELLENCE.**

- Quality for Life
- Continuous Research & Development
- Food Safety Innovation
- e-Traceability

## DNV GL ProSustain Certification



- ✓ **Level II: Product Sustainability Management**  
[Poultry]
  
- ✓ **Level III : Product Sustainability Performance**
  - S-Pure fresh chicken product for Thailand & Hong Kong
  - Yakitori chicken product for Norway
  - Steamed & Roasted chicken product for UK
  - Yakitori chicken product for Finland and Switzerland





**Group Refrigeration**



Type	kWatt-R (Approx.)	Refrigerant
Comm./Mobile	5,100	R22/R134a/ R404A/R407*
Small AC	3,000	R22/R410A
Large AC	17,300	R134a
Industrial-R	31,000	NH3/CO2
<b>Total</b>	<b>56,400</b>	

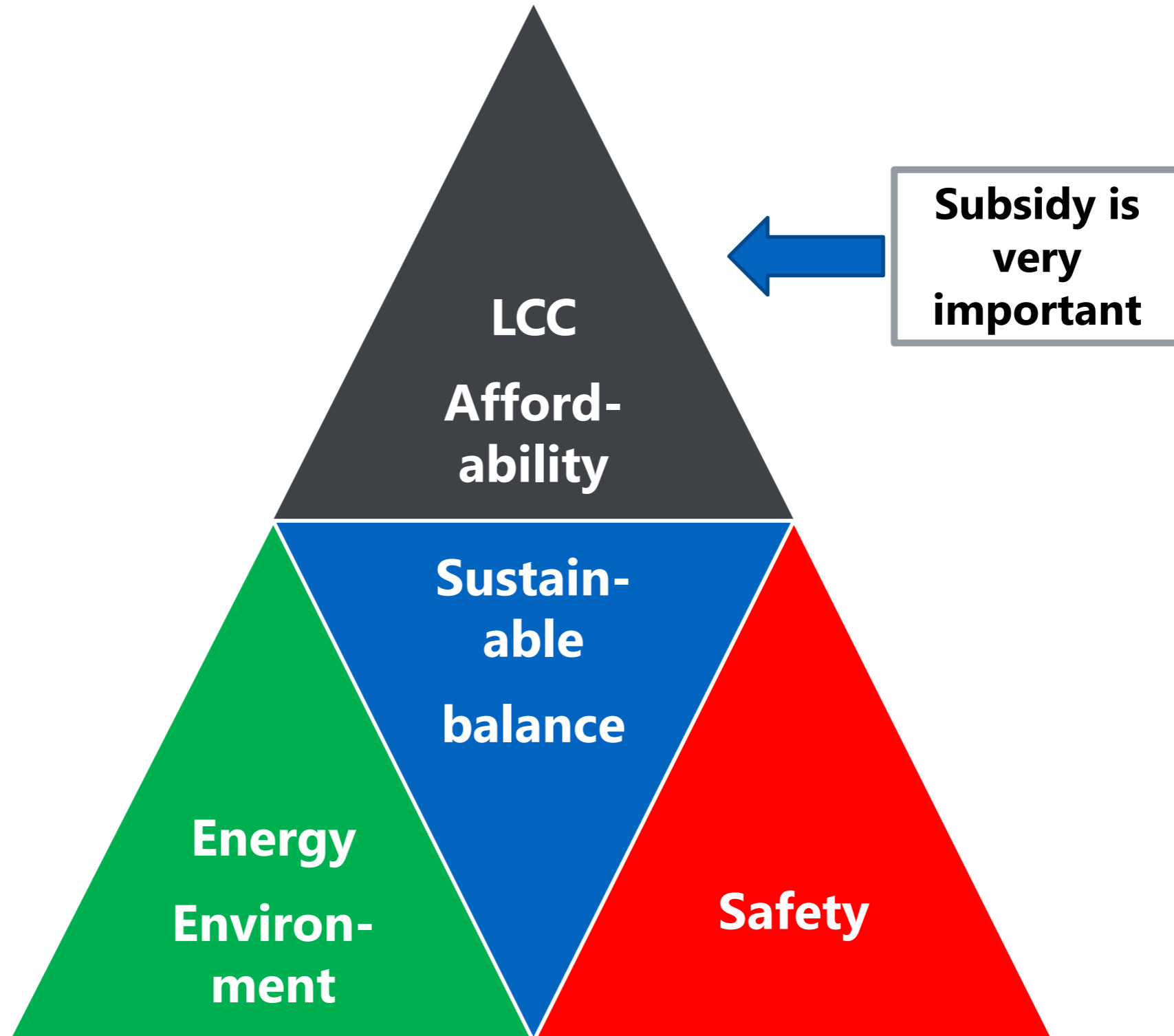
**Use NR/Low GWP  
refrigerant as  
much as possible**

**Try to use Heat  
Pump as much as  
possible**

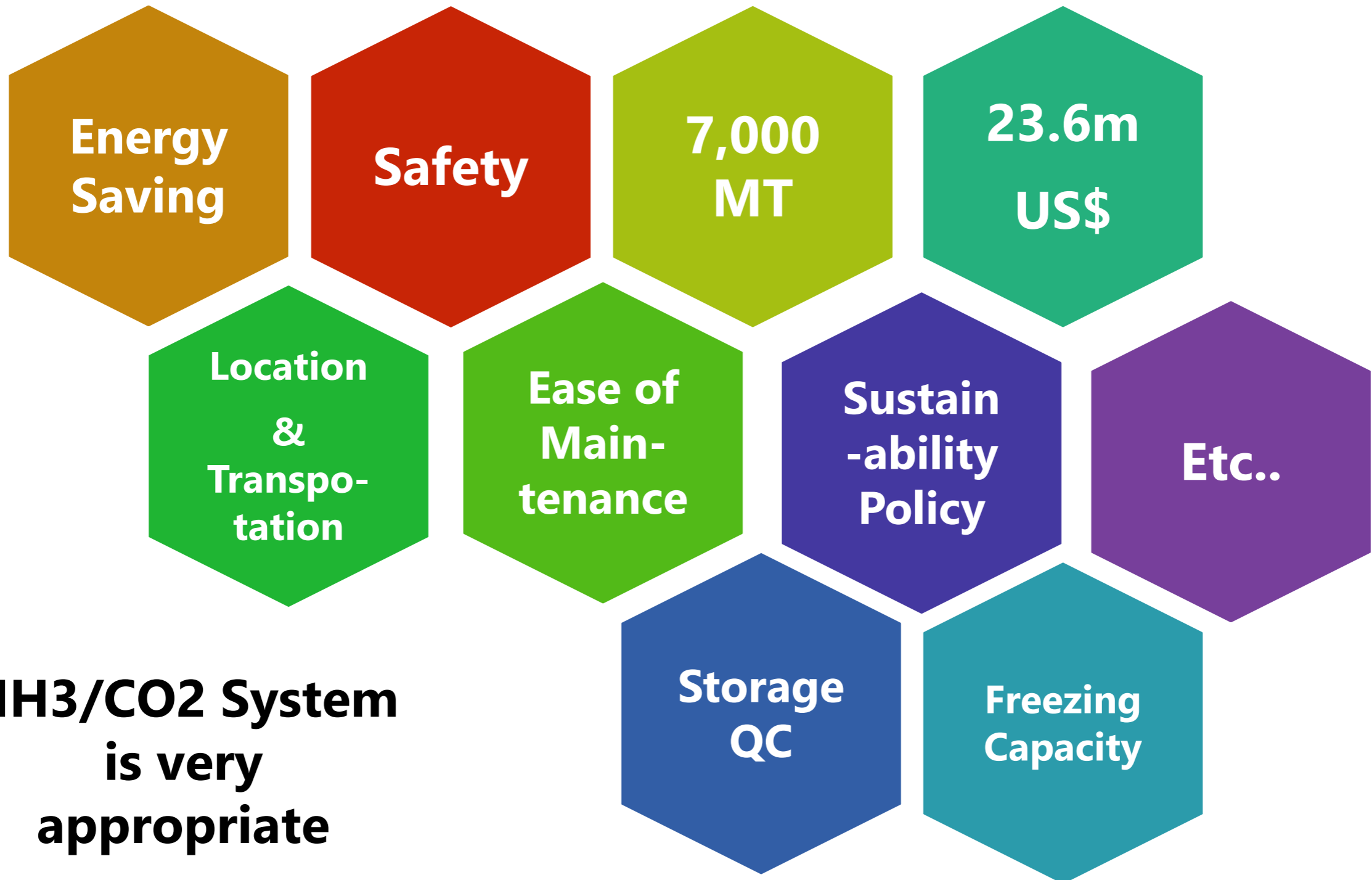
**Try to Recover  
Waste Heat as  
much as possible**

**Try to use  
Renewable  
Energy as much  
as possible**

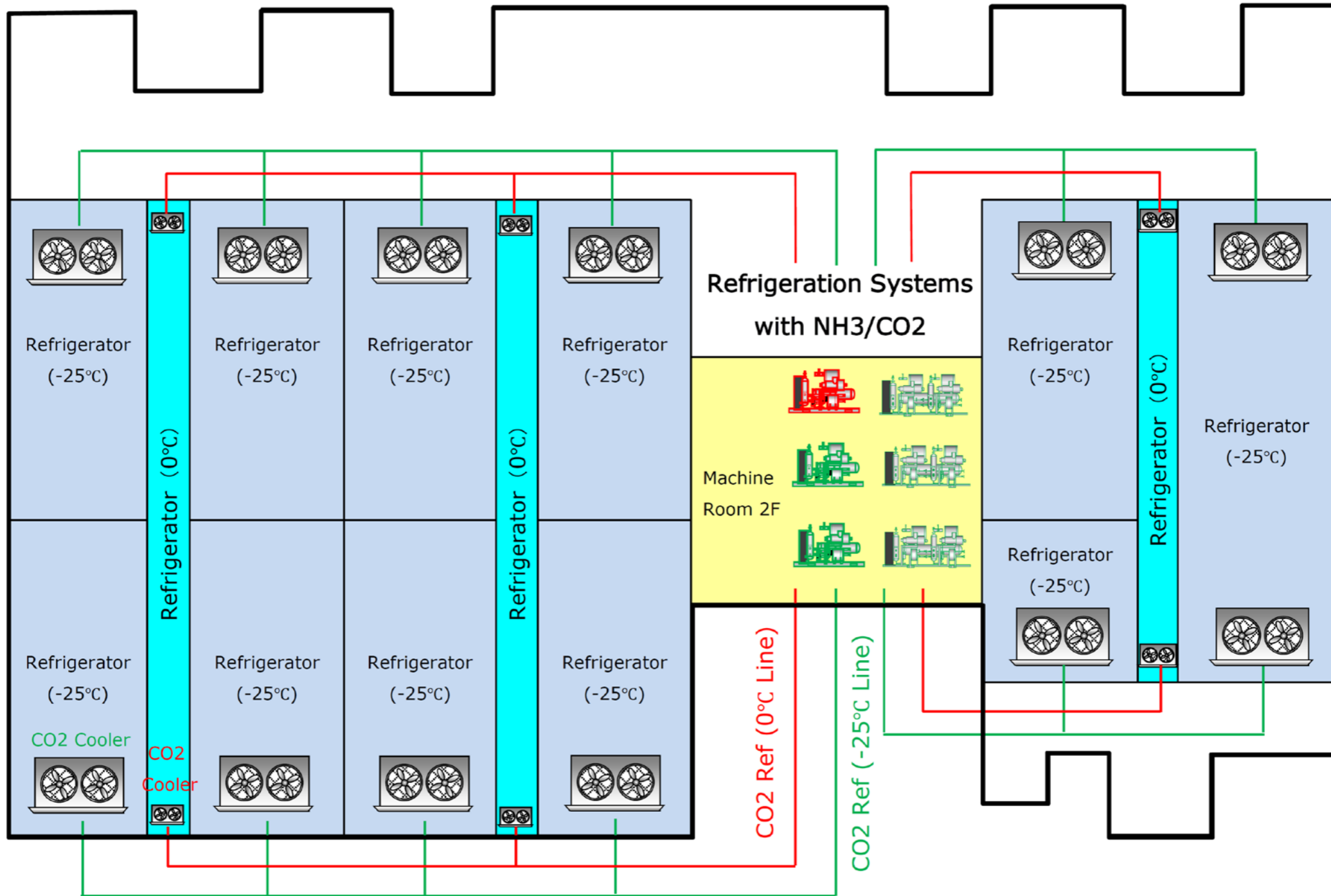
**Guidelines**



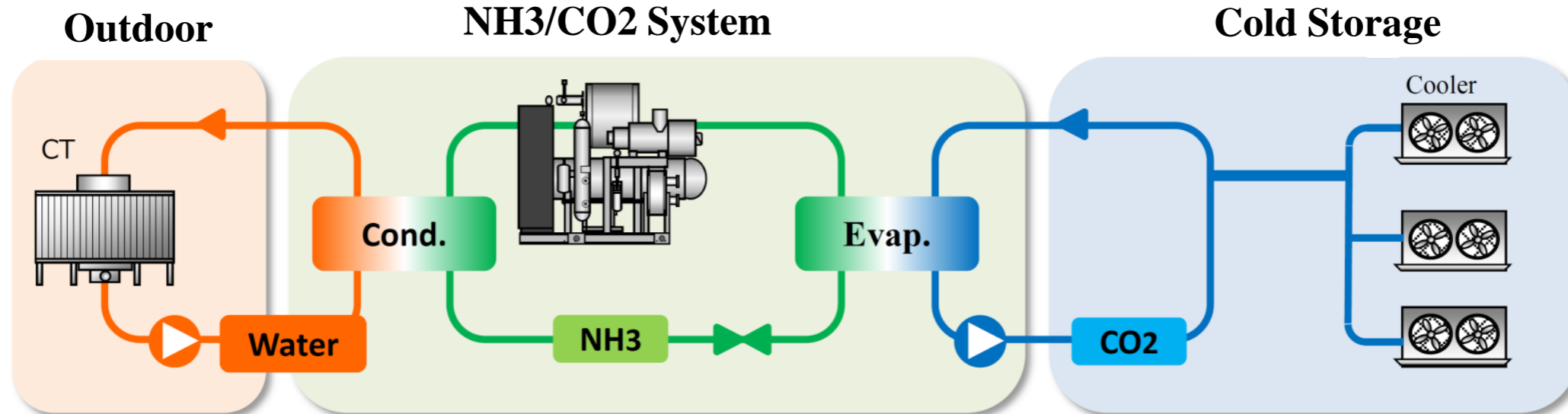




**NH3/CO2 System  
is very  
appropriate**

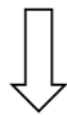


# NH3/CO2 Machine Concept



## Water cooled

- Energy saving
- NH3 charge min.
- Free layout
- Easy Maintenance



## NH3 Package

- New Screw compressor
- Semi-hermetic IPM motor
- Flooded Evaporator
- Double economizer
- Automatic operation



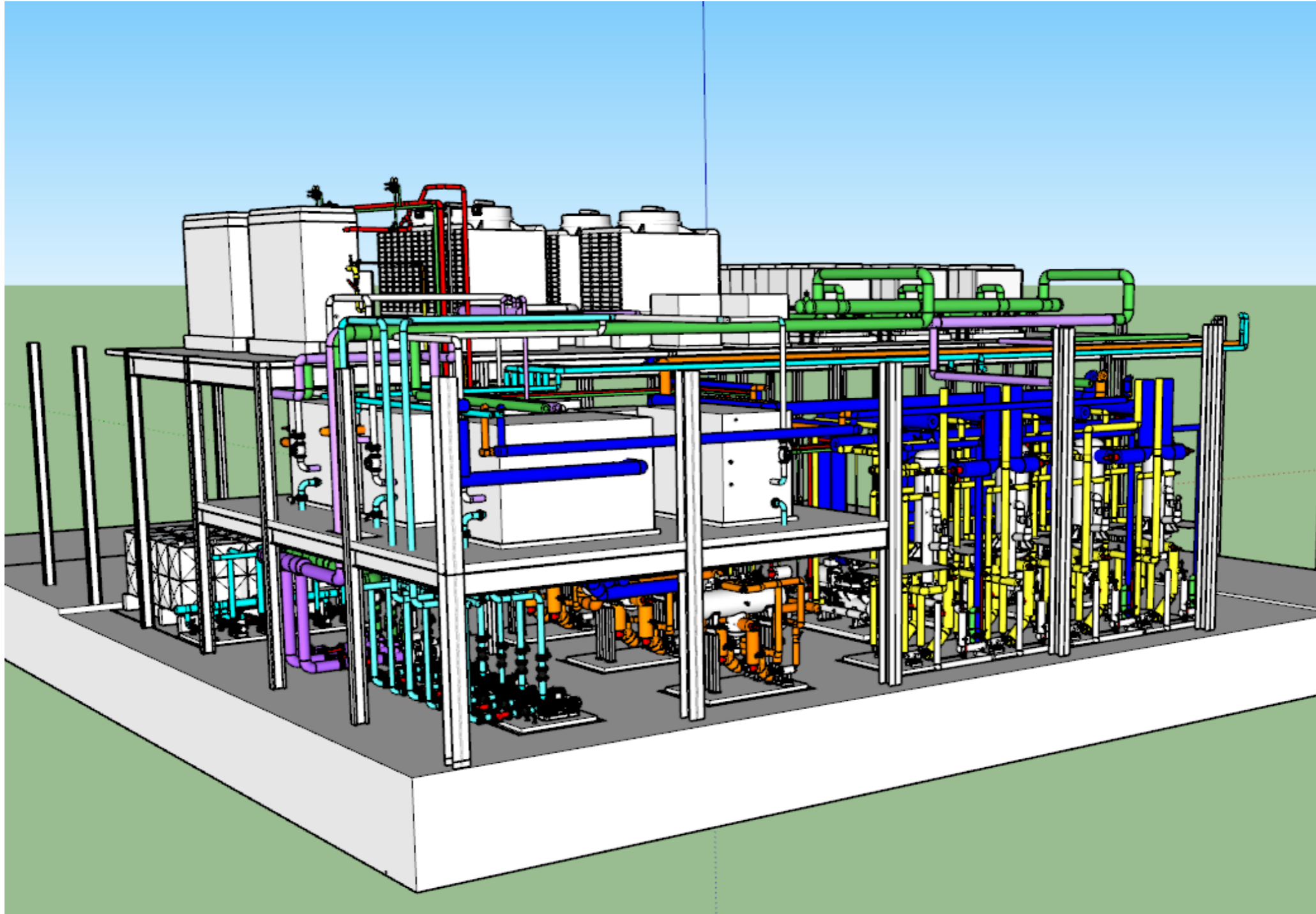
## CO2 brine

- Safety
- Low pump power
- No trouble by oil
- High heat transfer

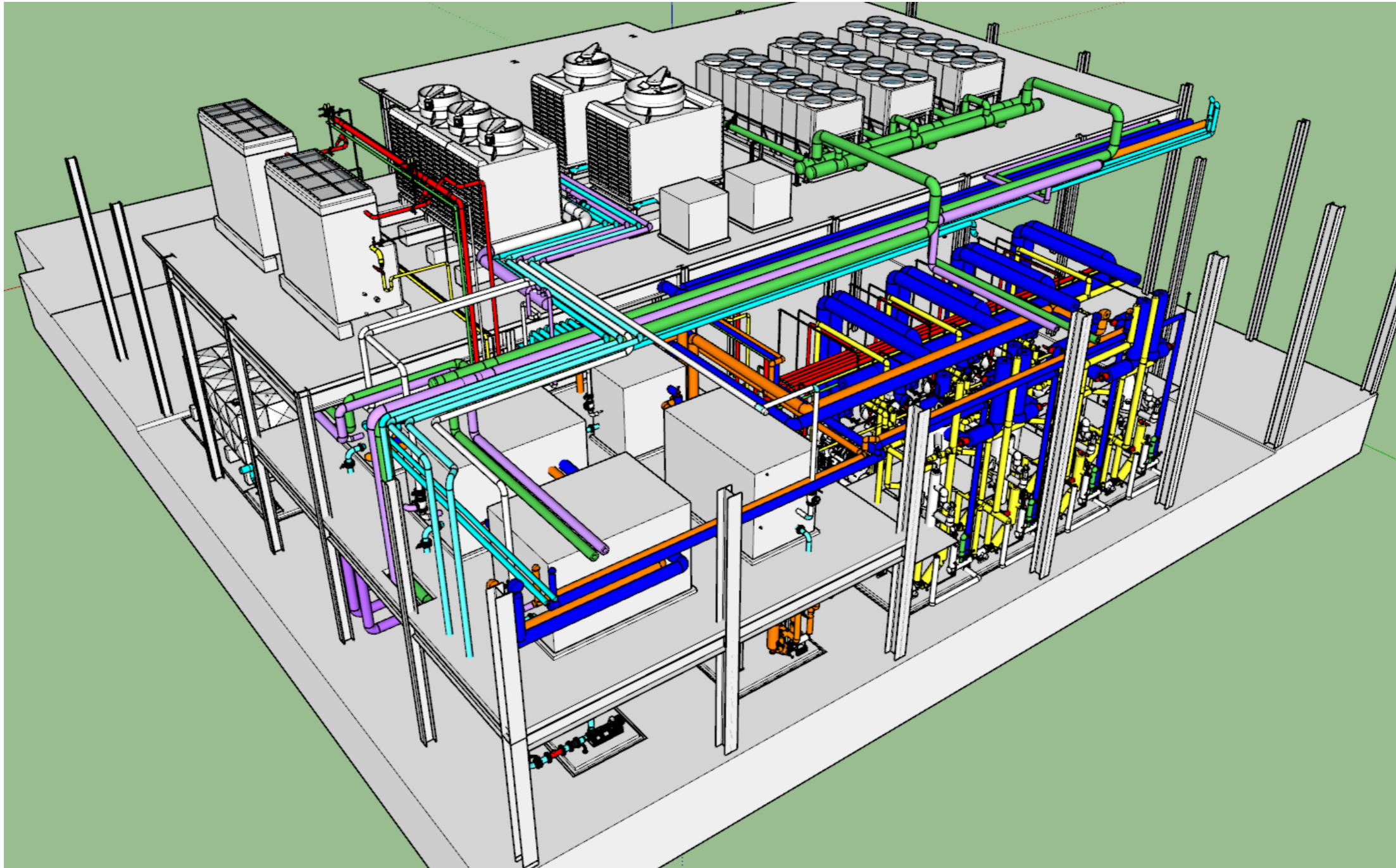


**Safety + Energy Saving + Easy Maintenance**

Machine Room



Machine Room





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## Machine Room



**BETAGRO**





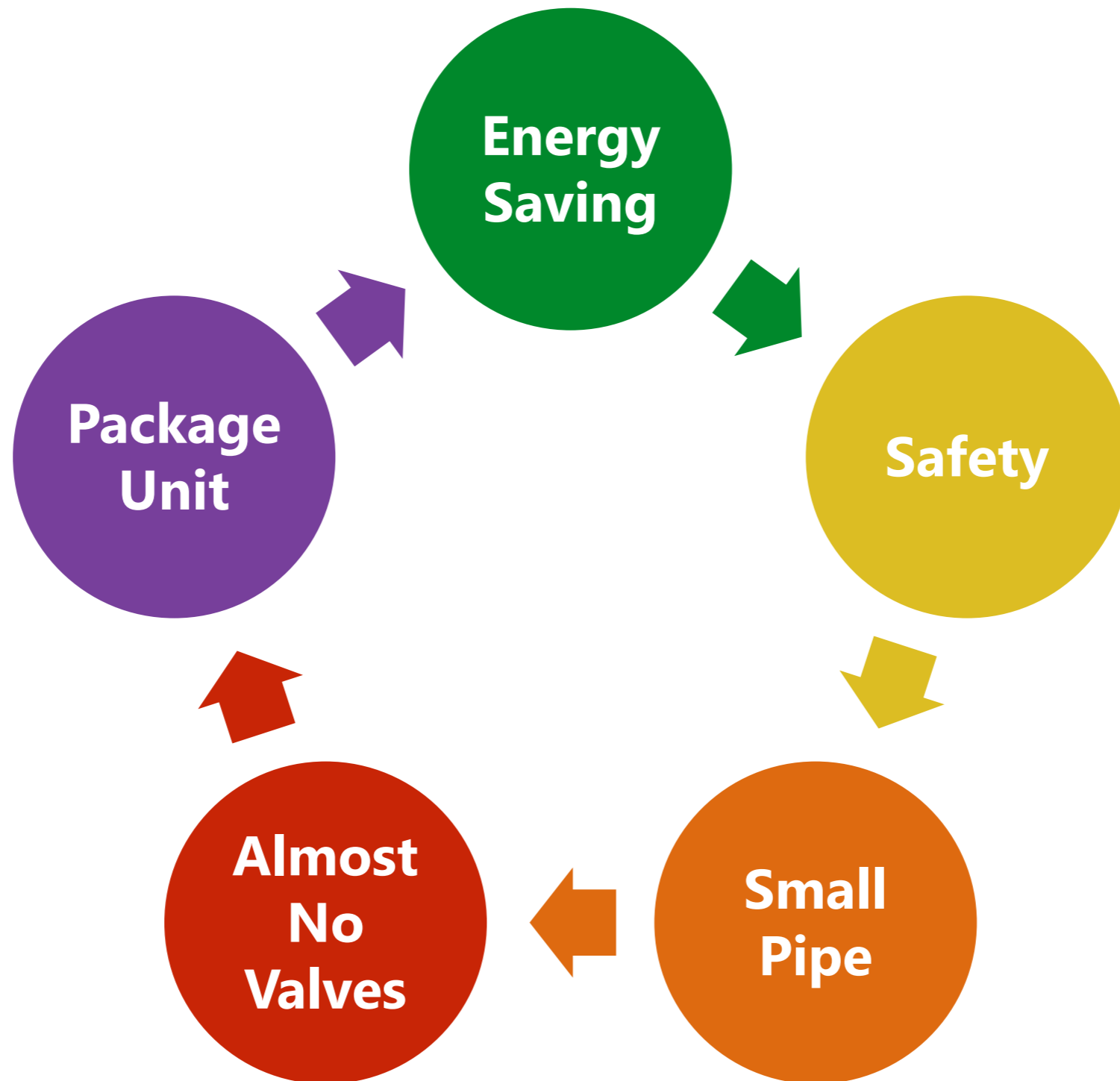






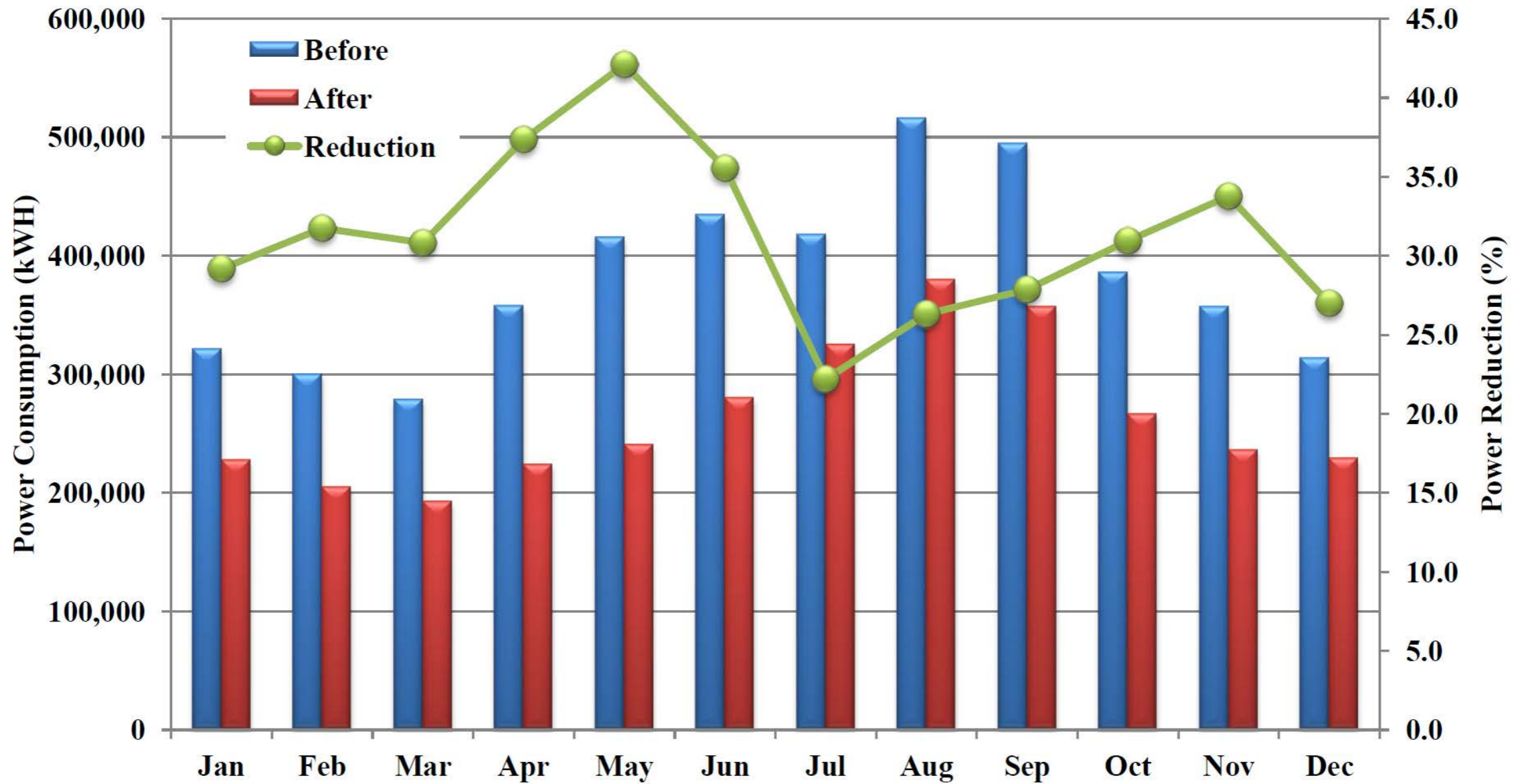


**Advantages**



# Saving in Other Project

(average -31.1%)





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**Thank you very much!**

