DAIKIN

Perfecting the Air

Carbon Neutrality Solution:

Healthy and Energy Efficient Air Conditioning(AC) system for ASEAN market

Aug 25, 2023

2.Reviewing last CEFIA, Feb, 2023

1. Last CEFIA, we talk about “excessive cooling culture in ASEAN”.
2. We proposed new “AC-ECP (Air conditioning system with excessive cooling protect)”,
   -Replacing existing normal ventilation to ERV (energy recovery ventilation).
   -Eliminating heat and humidity load resulting in comfort even at 26 degree C.

1. Last CEFIA Feb 16th, 2023

CEFIA Cleaner Energy Future Initiative for ASEAN ASEAN+3

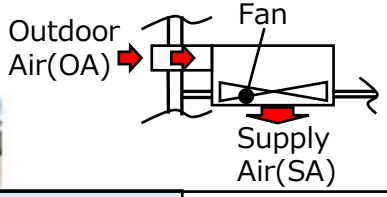
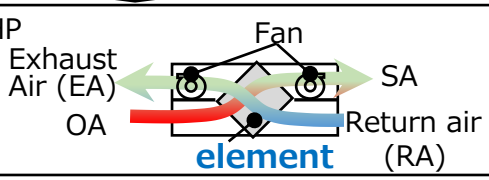
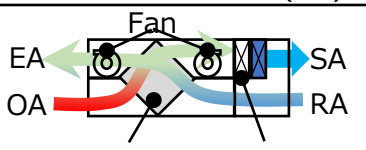
■ **Excessive cooling culture in ASEAN**

1)AC temp. setting is low at office.
(ex:23 degree, wearing jacket)

Ref)
-Covid19 increase ventilation
⇒AC Energy consumption up
-High rise energy price

If we can change the culture,
big energy saving can be achieved
contributing also to CN.

2.Carbon Neutrality Solution

	System	Description	Energy Spent	Hard Cost
Present	**A.** 18HP AC 23℃ + Normal Ventilation  	X SA temp: Same as outdoor	100 %	100 %
Newly proposed “AC-ECP”	**C.** 12HP AC 26℃ + ERV 	△ SA temp: Higher than indoor temp	66 %	75 %
	D. 12HP AC 26℃ + ERV with Refrigerant Coil 	○ Sa temp: Same as indoor temp	66 %	99 %
	E. AC 26℃ + ERV with Ref coil +Positive pressure control +CO2 demand control +AC interlock control 		53 %	101 %

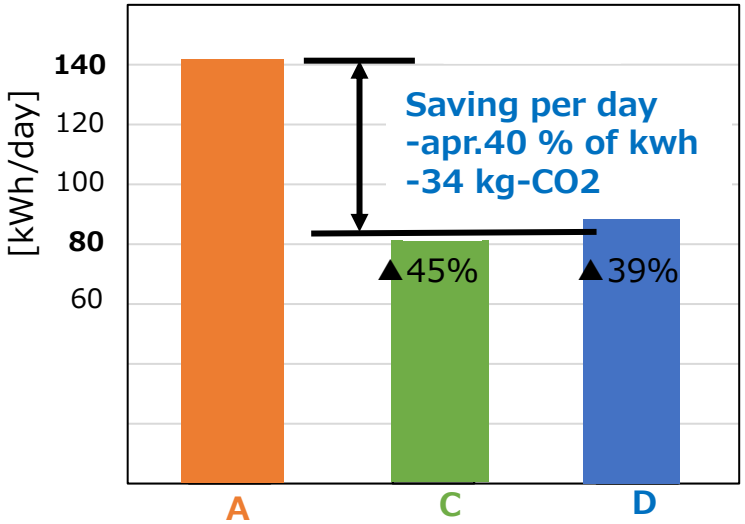
Today, we share you the verification result

3. Digests of verification (2) Result

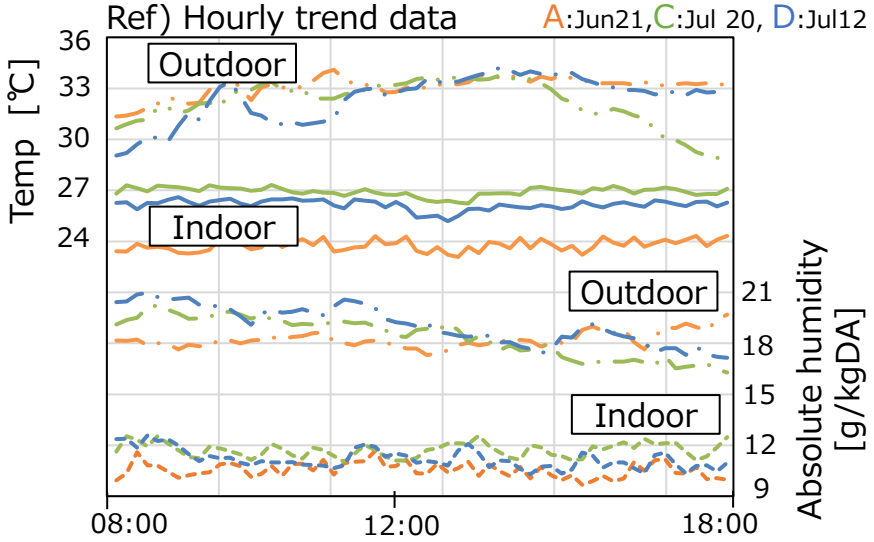
A: Conventional Natural ventilation, C: ERV only, D: ERV with Refrigerant coil

1.Approx 40% of energy was saved in case of proposed "AC-ECP(C&D)" compared to normal ventilation(A).
2.AC-ECP (D) is the most comfortable because,
2-1)No excessive cooling(26C), enough de-humidify(average 11g/kgDA)⇒ Mostly in ASHRAE comfort zone.
2-2)Questionnaire result is also matching with ASHRAE std55 evaluation.

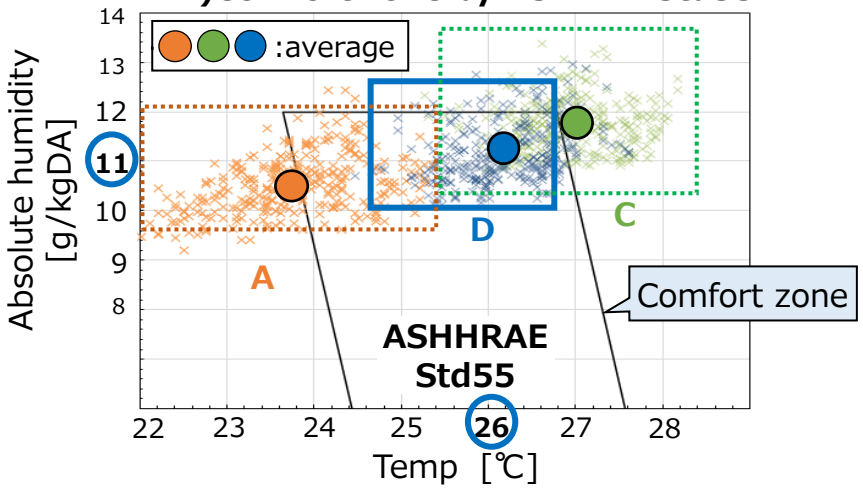
1.Energy consumption per day



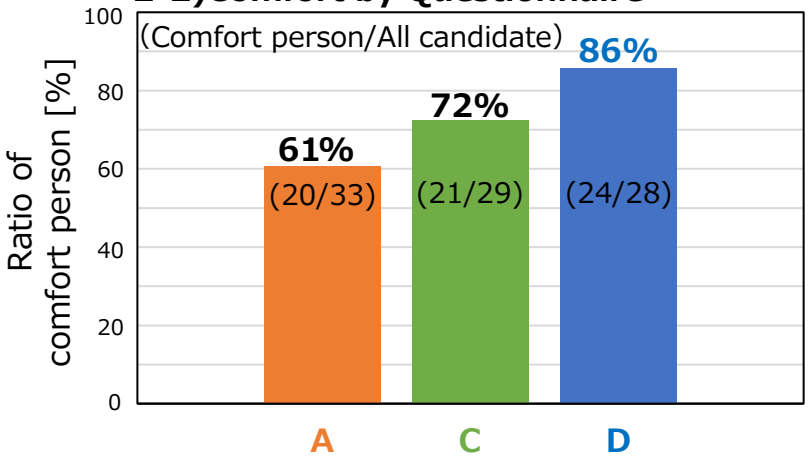
Ref) Hourly trend data



2-1)Comfort zone by ASHRAE Std55



2-2)Comfort by Questionnaire



4. Summary (1)

● Daikin ”AC-ECP”, using ERV with refrigerant coil, contribute to CN

- by reducing heat load and humidity from outdoor air,
  comfort and big energy saving is achieved---approx. 40%.
  (AC set temp is shifted 24℃→26℃)

● Further action

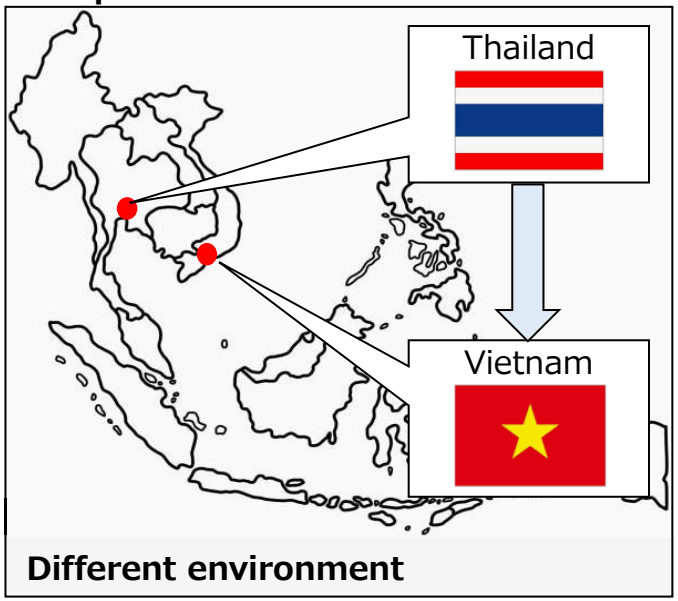
1. Continue verification of “AC-ECP”
   - Further energy saving by AC/Ventilation optimized control (ex:CO2 demand)
   - Further improvement on comfort using new ERV with higher efficiency.
   - Clarify key contents of operation and maintenance to keep initial condition.
   - Visualize energy consumption to help reduce energy at user operation.

2. Recognition development
   - Building sector :Increase air tightness and insulation
   - Government :Make policy toward CN introducing law and incentives
   - Other country :Expand to Vietnam

4. Summary (2)　Expand to Vietnam with workshop

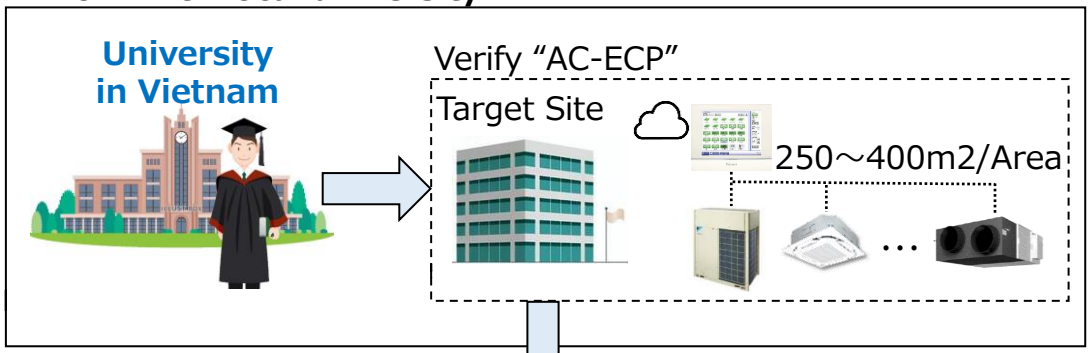
1.Expand "AC-ECP" to Vietnam to verify under different environment.
2.Work with local university to help make CN policy in regard to academic aspect.
3.Utilize project site for recognition development against government and industry

1. Expansion to Vietnam



Different environment

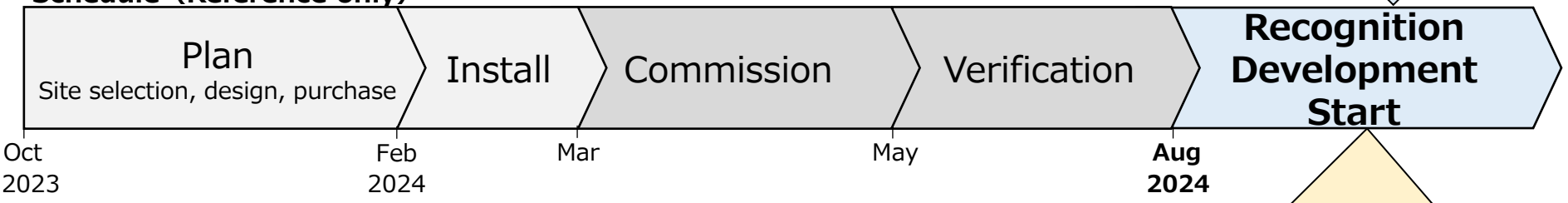
2.Work with local university



3.Recognition development

Utilize project site to show result for better understanding
-Government: Stake holders to make CN policy
-Industries　: Construction, Designer, Building owner, etc.

Schedule（Reference only）



Workshop will be held to show
- "AC-ECP" and its operation
- Test result

Thank you for your attention.