



[www.pac.co.th/freenergy](http://www.pac.co.th/freenergy)

## **PAC Freenergy** *Heat Recovery Water Heater*

Normal use of air-conditioner,  
Lower electricity cost, free hot water



**NATIONAL  
INNOVATION  
AWARDS 2020**



Gold Medal Prize  
48th Geneva International Exhibition

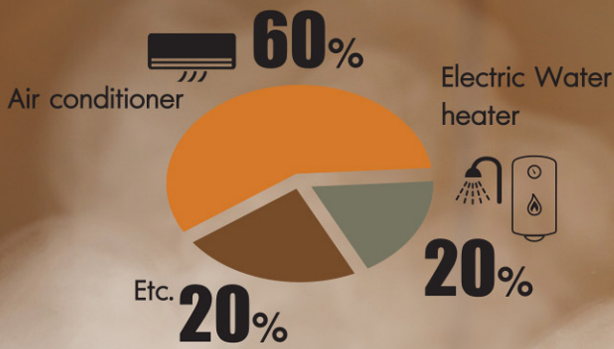


frenergy®

**Heat Recovery Water Heater**

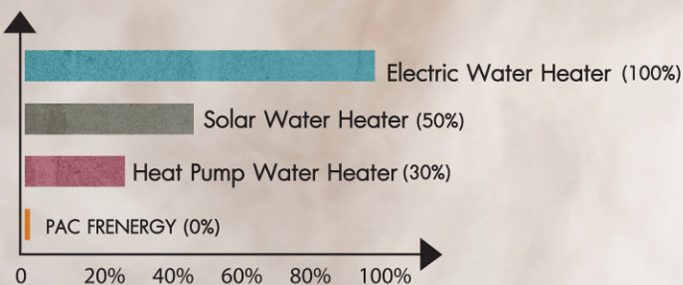
Electricity cost per unit is continually increasing, but electricity demand has never decrease. How can we lower this expense?

Do you know that the home appliance which most electricity used is air-conditioner, followed by electric water heater?

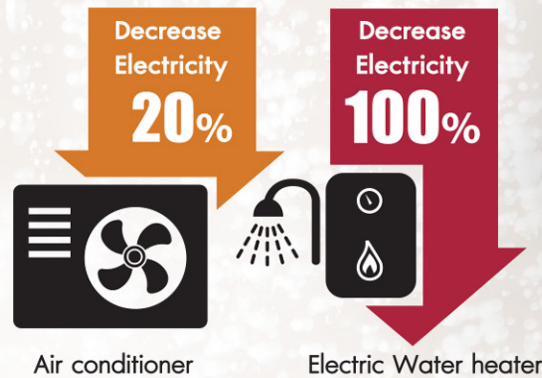


Is it a great idea if we turn on air-conditioners for coolness and comfort and at the same time getting free hotwater ? The more we use air-conditioners, the more we save and also lower electricity cost of the air-conditioners.

Cost comparison between PAC Frenergy and other hot water generation methods



**Free hot water from Air Con.**  
No electricity used to produce hot water and can be save air conditioner electricity cost for up to 20%



**Special feature and technology** *Optimal Material*

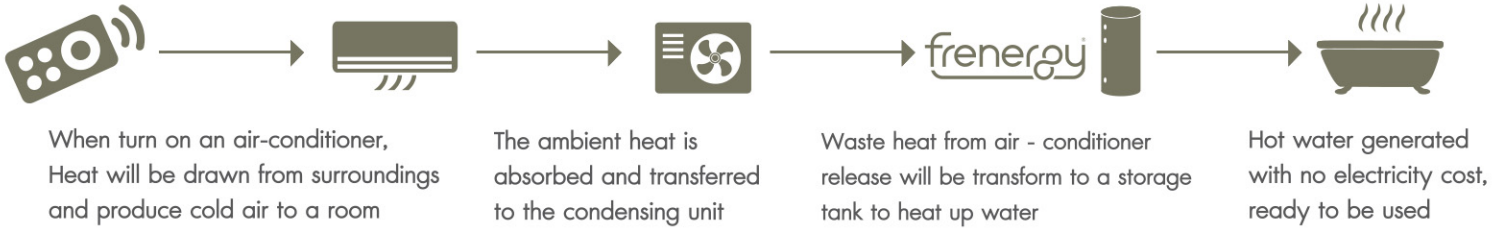
Reduce heat release from air compressor up to 15%

100% electricity saving in hot water producing

Save energy from air conditioning up to 6.25 kw/ hr and also reduce green house effect up to 2.88 kgCO<sub>2</sub>e/ hr



# PAC Frenergy Working Principle



## Special features

- ✔ Inner tank made of Vitreous Enamel Coated Steel, German DIN 4753 Standard. Superior corrosion resistance. Suitable for water in all conditions especially areas with poor water qualities.
- ✔ Passed Australian Standard AS/NZS 4692.1:2005 test. Max operating temperature 90 °c without any damages of the internal tank surface.
- ✔ Higher potential of corrosion protection. By using of high density stainless steel core Magnesium Anode designed in suitable length in each model for the most effectiveness.
- ✔ Set of heat exchanger is specially designed for increasing the heat exchanging area, results to water heat up faster without load increasing to an air conditioner.
- ✔ Set of heat exchanger is designed for high pressure duration. PAC Frenergy has potential to apply with various refrigerants such as R22, R410a, R32, R134a.
- ✔ Clean, safe, and no contamination likewise drinking water storage tank standard. No contact between water and air in heat exchanging process. Since water is heated by sets of heat exchanger through outside surface of the inside tank.
- ✔ Heated water can be kept inside the tank for 36 hours.\* The insulation is made of non-CFC polyurethane that has properties of heat reservation and loss reduction.
- ✔ No need a pump to supply water, the storage tank is the pressure tank. Save money for equipment and electricity cost Able to be installed with 1-2 air conditioners\*\* since maximum 2 sets of heat exchangers equipped inside the tank.
- ✔ Safety valve as Temperature/Pressure valve ensures the safety according to Australian ANSI Z21.22/CSA 4.4 standard.
- ✔ In case of no air-conditioner operation for a long time, the backup heater\*\*\* will instead heat up the system. Water resistant heater cover is a perfect design for outdoor installation.
- ✔ Low heat transfer rate and high quality UPVC drain valve is equipped for easy water drainage and clean.
- ✔ The tank external layer is made of high quality heat-galvanized plate passed the coating process for outdoor use, corrosion protection, and longer lifetime.

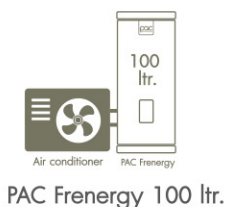
Patent No. 73139

\* Refer to the term of use. \*\* The details vary by model. \*\*\* Accessory.



## Return of investment

calculated from PAC Frenergy 100 Liter installation which suitable for bathing 4 persons/day, the payback period is 2.12 years, (Calculated base on energy saving per month and Frenergy retail price)



Payback period is **2.12** Years

\* Referred to normal hot water usage per person in 10 mins

\*\* Calculated only hot water usage in bathroom

# PAC Frenergy Installation



**20%**  
Electricity Saving

**PAC Frenergy**



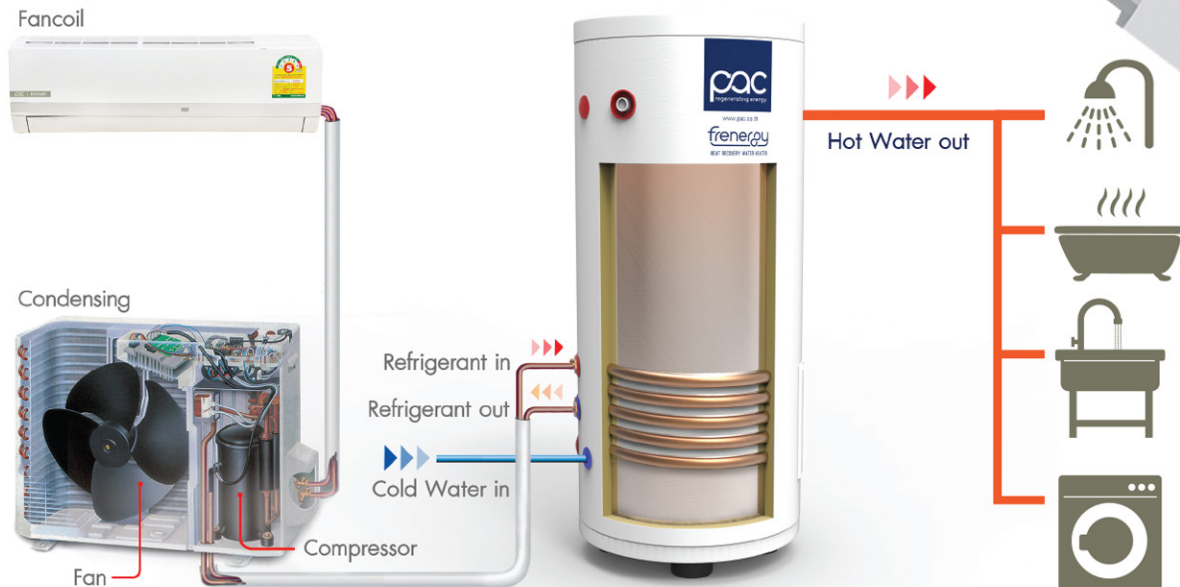
**Free**  
No Electricity use

PAC Frenergy can be installed with up to 2 air conditioners for sufficient hot water production

PAC Frenergy is a pressure tank. When hot water is out to use, cold water will be automatically replaced to the tank. No water pump needed for hot water supply

Hot water produced by PAC Frenergy can be supply by hot water pipe for various uses such as bathroom, kitchen or washing machine

## PAC Frenergy System





My Beach Resort



V Villas Huahin



Gangehi Island Resort Maldives



SIFCO-POLCO Condominium Maldives



Koh Kood Paradise Beach Resort



Samoeng-Center Chiang Mai



Park Hyatt Maldives Hadahaa



## More hot water use, more money save

PAC Frenergy Water Heater using waste heat of air-conditioner is the most cost-effective water heater innovation as it applies waste heat of air-conditioner to produce hot water and serves various purposes such as residence, condominium, hotel, resort, spa, fitness center, hospital, restaurant, coffee shop and industrial plants

## PAC Frenergy Reference

- Charoen Pokphand Foods Public Company Limited
- 99 Residence Rama 9
- Aria Hunhin
- The Clouds Hunhin
- SIFCO-POLCO Condominium – Maldives
- Park Hyatt Maldives Hadahaa – Maldives
- Centara Grand Island Resort & Spa Maldives - Maldives
- Besides Sports Srinakarin Bangkok
- Bright Condominium Sukhumvit 24
- Qiu Hotel Sukhumvit
- Dr. Twarath Sutabutr
- Samoeng Center
- Nasaraan boutique hotel
- Montis Resort Pai -Mae Hong Son
- Kavin Buri Green Hotel – Udon Thani
- Koh Chang Paradise Resort & Spa
- Koh Kood Paradise Beach Resort
- Capstone Resort – Phetchaburi
- Cae Villas – Hunhin
- V Villas – Hunhin
- My Beach Resort Phuket
- The Waters Khao Lak by Katathani – Phuket
- The Senses Resort & Pool Villas – Phuket
- The Racha Resort – Phuket
- Movenpick Resort & Spa Karon Beach - Phuket
- The Ritz Carlton – Koh Samui
- Sala Samui Resort and Spa – Koh Samui
- Aqua Babies Little Sharks Thailand – Hat Yai
- Khun Patra Sweet House – Khon Kaen
- Bow Bakery House
- Hat Yai Hospital
- Queen Sirikit National Institute of Child Health
- Chom Dao Hotel & Resort – Sakon Nakhon
- Siam Preserved Foods Co.,Ltd
- Khaokho bay bay
- Highland Villas Hua Hin
- One Mahachai
- The Stock Exchange of Thailand
- Windsor Park & Golf Club Bangkok

# PAC Frenergy Specification



## Heat Recovery Water Heater



Model		PAM-0601	PAM-1001 PAM-1002	PAM-1501 PAM-1502	PAM-2002	PAM-3002	PAM-4502
Capacity	liter	60	100	150	200	300	450
Heat exchanger coil circuit**	set	1	1-2	1-2	2	2	2
Backup Heater	watt		1500			2500	
Dimension (DxH)	mm	450x800	450x1150	520x1220	520x1551	620x1562	710x1760
Unit weight	kg	35	41/45	59/63	79	95	120
Operating weight	kg	95	141/145	209/213	279	395	570
Operating water pressure	bar			8.5			
Operating refrigerant pressure	bar			35			
Testing water pressure	bar			17			
Testing refrigerant pressure	bar			50			
Outer tank material				Coated Steel (Beige color)			
Inner tank material				Vitreous Enamel Coated Steel			
Insulation				High Density Polyurethane			
Water connection size	inch			3/4"			
Refrigerant connection size	inch			1/2"			
TP Valve specification				99°C/10 bar			
Backup heater connection***	inch			1"			

According to a lab test:  
100 liter PAC Frenergy installed with a 12,500 BTU air-conditioner increases water temperature from 28°C to 40°C in hour and to 60°C in 5 hours.

## PAC Frenergy Tank Calculation

	<b>450</b> Liter
	<b>300</b> Liter
	<b>200</b> Liter
	<b>150</b> Liter
	<b>100</b> Liter
	<b>60</b> Liter

- Shower
- Kitchen Sink
- Bathtub 200 Liter



PAC Corporation ( Thailand ) Co.,Ltd.  
12/2 Vision Business Park Phase 2,  
Soi Ramintra 55/8, Ramintra Rd.,  
Tarang, Bangkhen, Bangkok 10230 Thailand  
Tel: +66 (0) 2347 0447  
Email: info@pac.co.th www.pac.co.th  
@2024 PAC All rights reserved

## AWARDS



- Top SME Awards 2023 – Energy Innovation
- 2023 Winner The pitching season 3
- Gold Medal 48 th Geneva International Exhibition of Inventions
- Proud Past – Inspired Future Certificate of Recognition Best of the Best, Prime Minister’s Export Award 2022
- Proud of the SME National Awards 2022, SME Award for Innovation
- National Innovation Awards 2020
- IP Champion 2020
- Prime Minister’s Export Award 2020
- Thailand Green Design Awards 2018
- Passport to Global Challenge
- Global Cleantech Innovation Awards (GCIIP Thailand Awards 2017)
- 7 Innovation Awards 2017
- Premium Product of Thailand Awards 2015 – Ministry of Industry
- Seoul International Innovation Fair (SIIF) Awards 203 – Korea
- International Invention and Innovation Exhibition (ITEX) Awards 2013 – Malaysia
- i2P Contest 2013 – Department of Intellectual Property, Ministry of Commerce



line: @pac.th