SOLAR THERMAL: RENEWABLE HEAT FOR CARBON REDUCTION

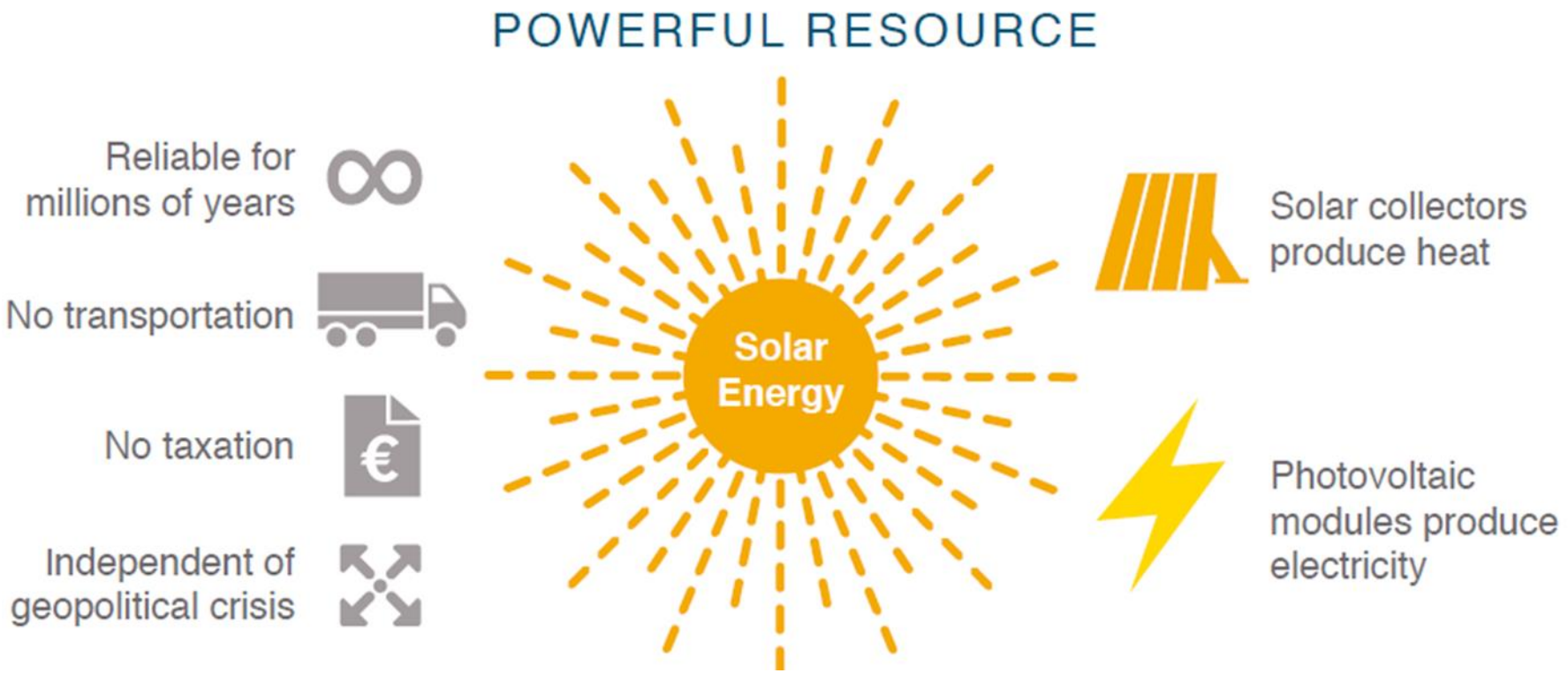
Production of hot water from the sun

Normal Baharu Bandar Rendah Karbon Siri 5.0

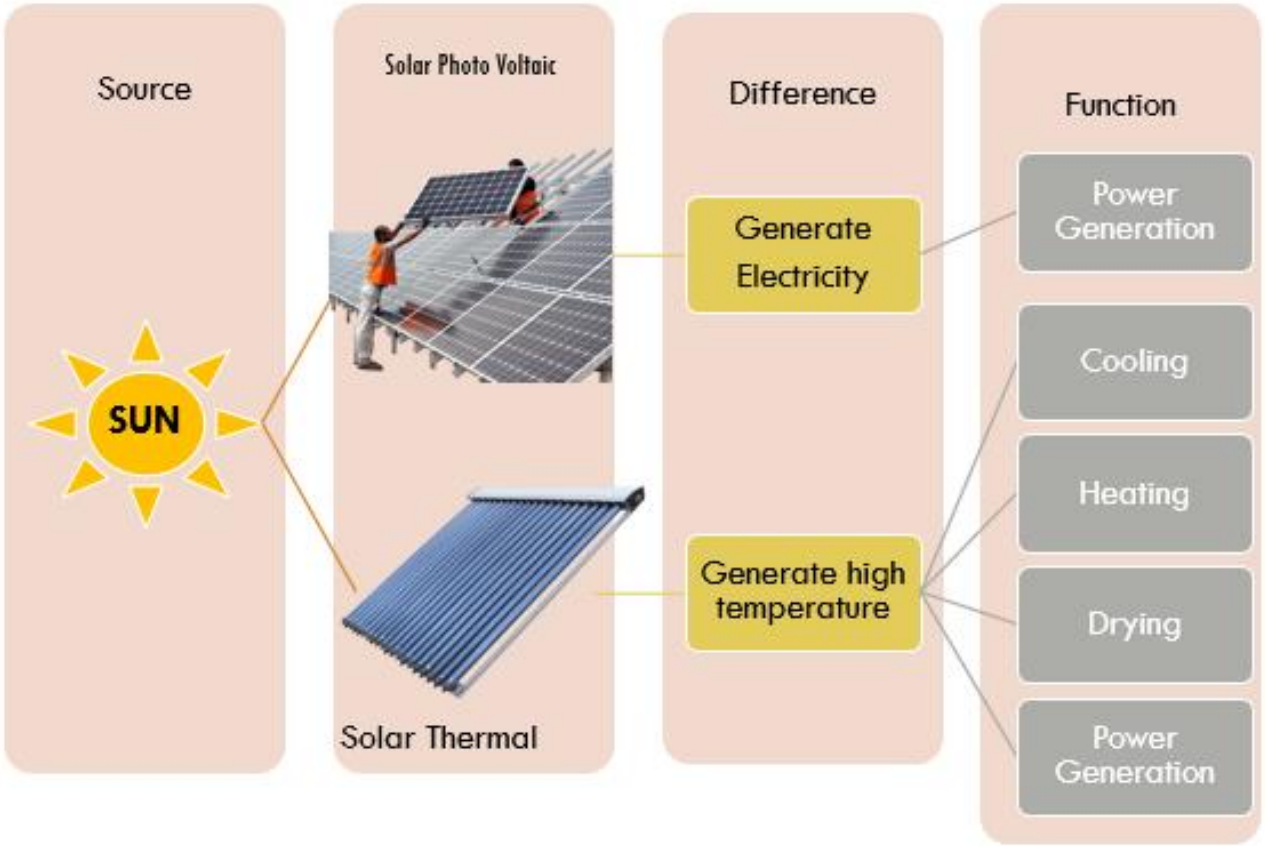
WE ARE VERY FAMILIAR WITH THIS

BUT THIS WAS HERE FIRST

WHY SOLAR THERMAL ?



SOLAR CONVERSION TECHNOLOGY



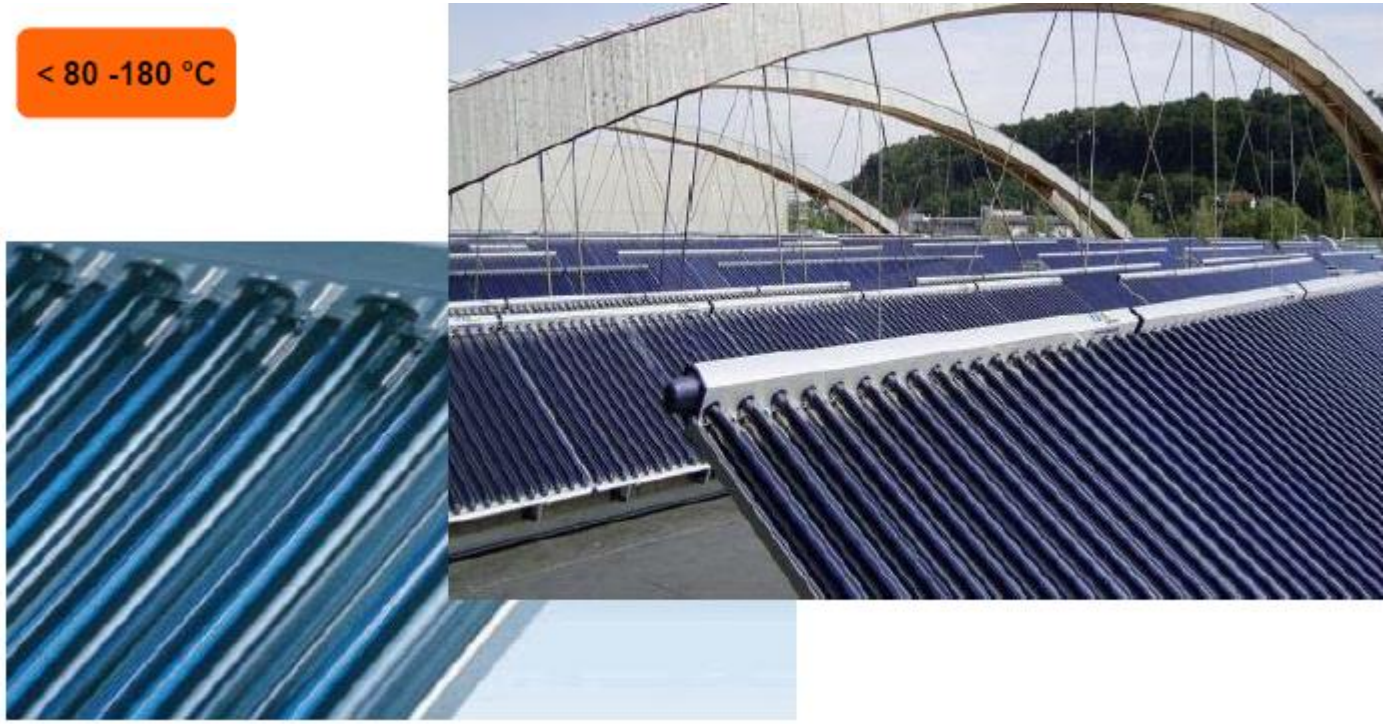
FLAT PLATE COLLECTOR

< 85 °C

Price: RM1,200 to RM1,800 per sq meter

EVACUATED TUBE COLLECTOR

< 80 -180 °C



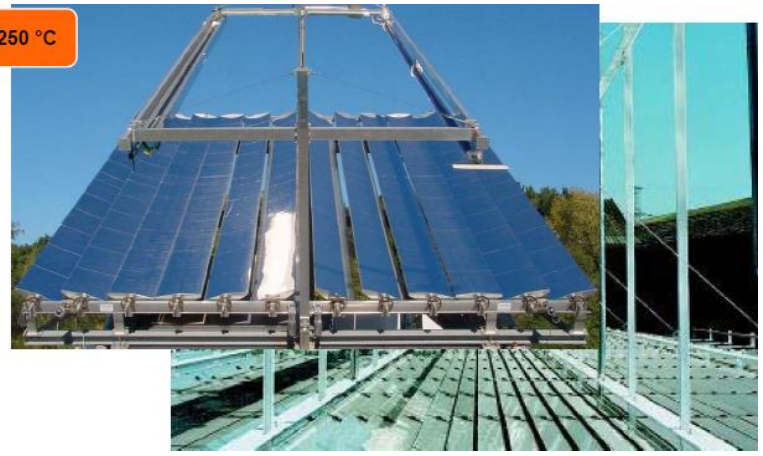
Price: RM1,500 to RM2,500 per sq meter

CONCENTRATING COLLECTOR

< 80 -180 °C

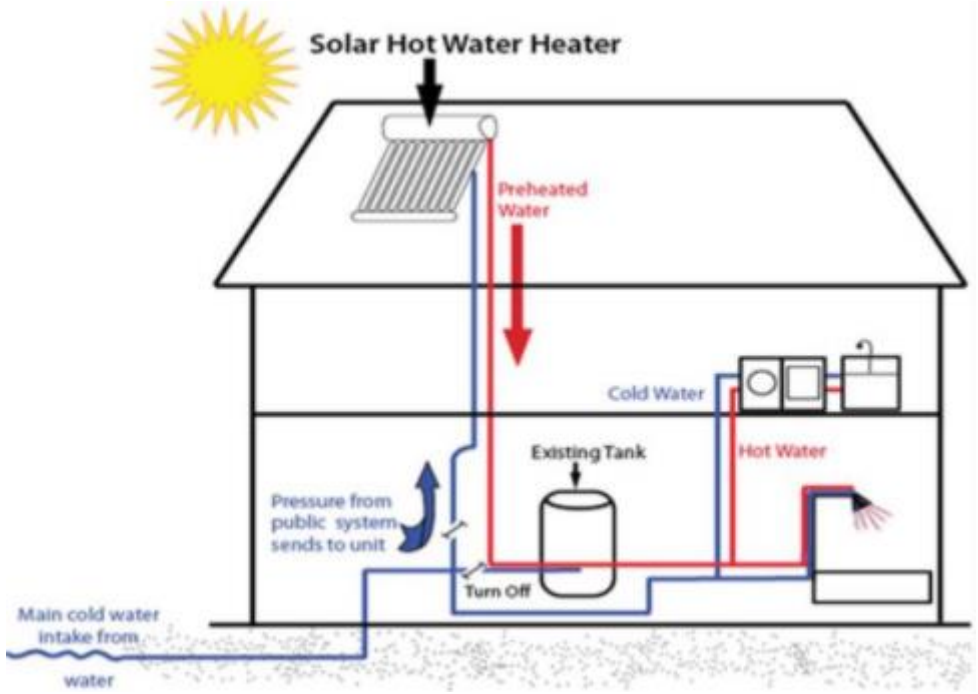
120-250 °C

< 120 - 250 °C



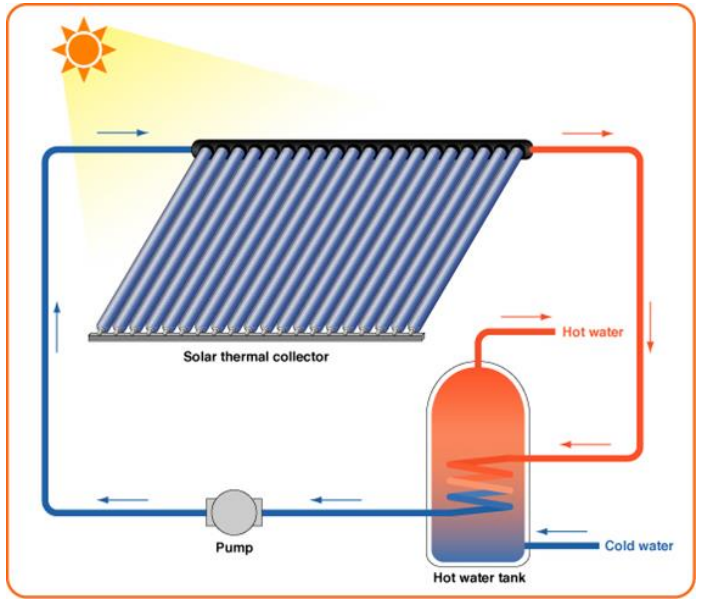
Can generate very high temperature but not suitable for Malaysia climate as we have diffused sun (cloudy sky)

SOLAR DOMESTIC HOT WATER



Benefits

- Cost Saving
- GHG Reduction



SOLAR THERMAL IN BUILDINGS

Solar Cooling:
Project Shaftsbury Square, Cyberjaya
PKNS HQ, Shah Alam

Project Shaftsbury Square, Cyberjaya
Source: SDC.my

Hot water:
Hospital UKM
Hospital Sungai Buloh
Hospital Sandakan
Hospital Sarikei

PKNS HQ, SHAH ALAM
• Absorption cooling powered by 5,000 solar evacuated tubes

Source: neapoli.com.my

DE BARON RESORT

Established: **1982**
Main product: **Hotel**
Turnover 2014: **RM 8 million**
No of employees: **96**

Technical Issues/Problems:
High electricity consumption for electric storage heater for shower

Solutions
•Installation of solar thermal hot water (45m2) by replace the electric storage heater

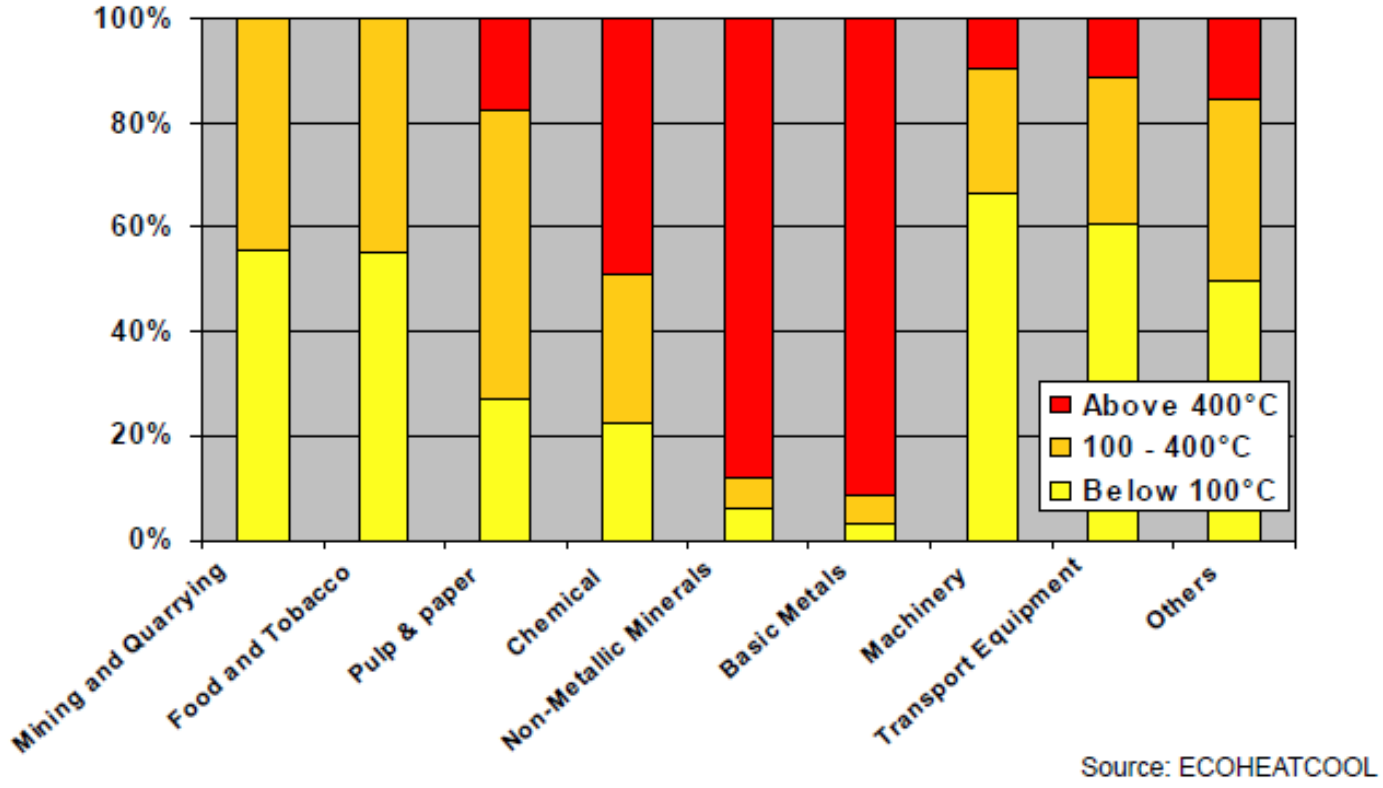
before using Storage heater

Now Solar Thermal

Outcome

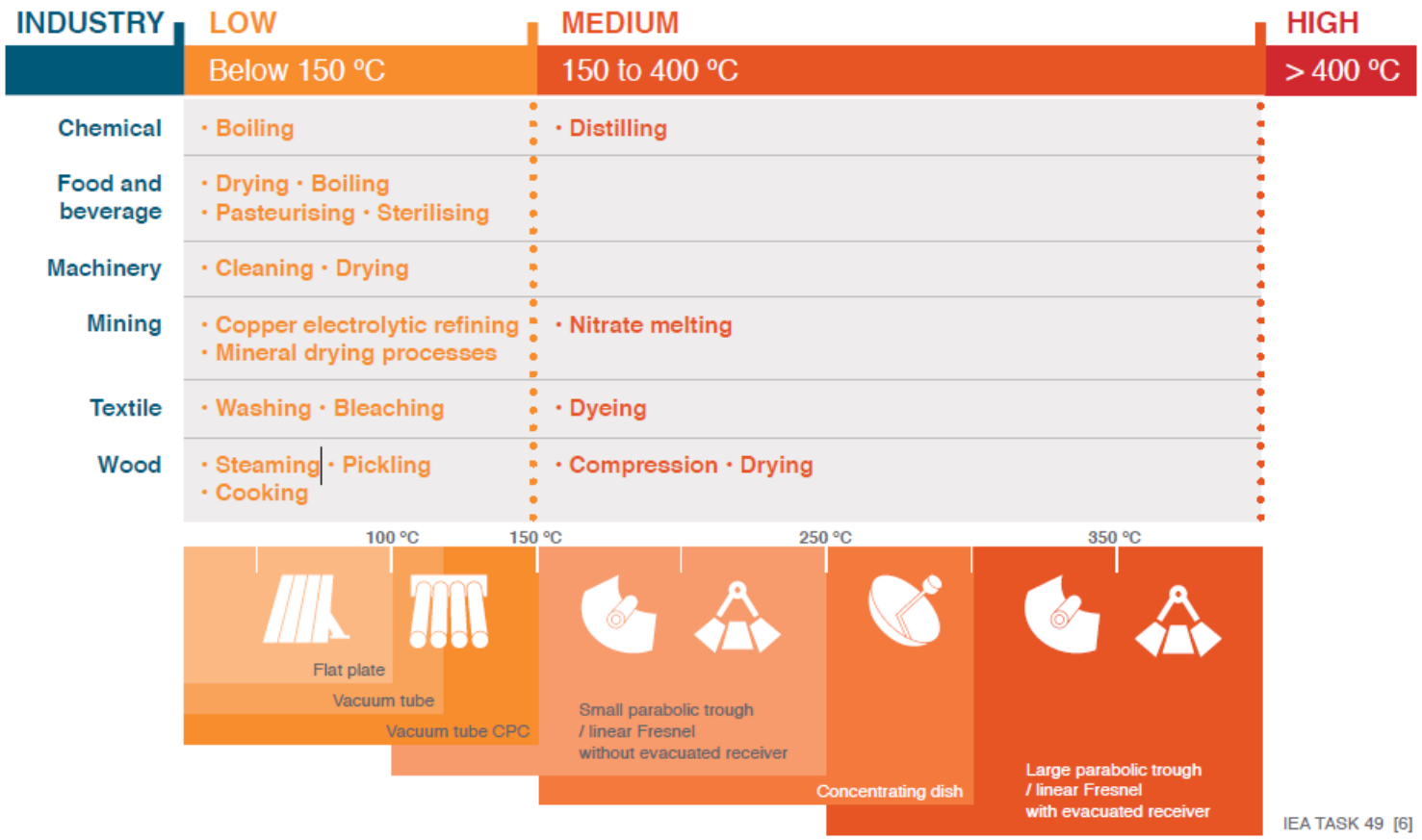
- **Electric reduction**: 30%
- **Economic savings**: at least 20 % reduction in expenditure for electricity (RM840,000/year)
- **Environmental effect:** 369,600 kWh/yr, 274 ton CO2e/yr)
- Creates model for industry-wide solution for hotel industry PB: 4.5 yrs

INDUSTRIAL HEAT DEMAND BY TEMPERATURE LEVEL & INDUSTRIAL SECTOR



Source: ECOHEATCOOL

COLLECTOR & APPLICATION



SOLAR HEAT FOR INDUSTRIAL PROCESSES (SHIP)

solar collector field,

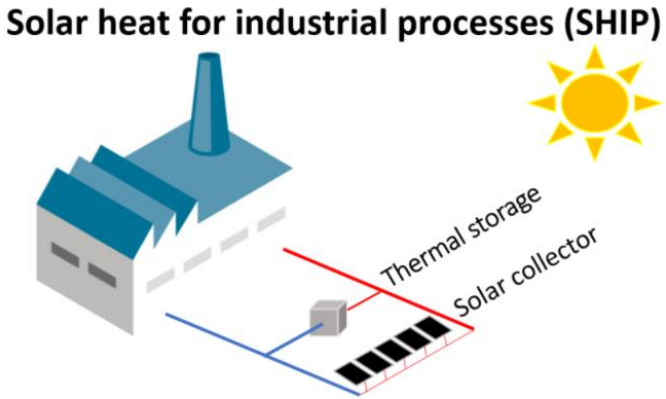
- through which a working fluid circulate

a heat exchanger,

- heat is transferred from the primary circuit to the process heat circuit in the form of hot water, air flow or steam, depending on the requirement

a heat storage unit

- to increase the period of the day when heat is supplied to compensate for variations of the solar resource, but also to even out the fluctuating heat demand at batch processes.



SOLAR THERMAL IN FOOD INDUSTRY

Drying Cat Fish, Koperasi Zuriat Haji Abdul Rahman Kubang Pasu Berhad

Sate Ikan, Pulau Pangkor

Hot water in F&B Sectors

SOLAR THERMAL IN FOOD INDUSTRY

MUSLIM Kitchen

PPNJ PERTUBUHAN PELADANG NEGERI JOHOR

Ameen® Sejak 1982

miwa Jelly Drink

Drying
(30-90 °C)

Washing (**40-80 °C**)

Pasteurizing
(80-110 °C)

Boiling
(95-105°C)

Sterilizing
(140-150°C)

Heat treatment
(40-60 °C)

MIWA Manufacturing

Miwa Manufacturing Sdn. Bhd

Established: **2015**
Location: **Ijok, Kuala Selangor**
Main product: **Jelly drinks**
Brand: **MIWA OLI**
Turnover 2016: **RM1.2 million**
No of employees: **20**

Technical Issues/Problems:

- High energy consumption for electric boiler
- Need to upgrade capacity of electric boiler to increase the production

Solutions/work in progress

- Installation of solar thermal hot water by alternative using electric boiler

Jelly manufacturing products

Existing Electric Boiler

Propose /replaced by solar thermal system

Mixing process

Filling process

Hot water used for jelly drink product

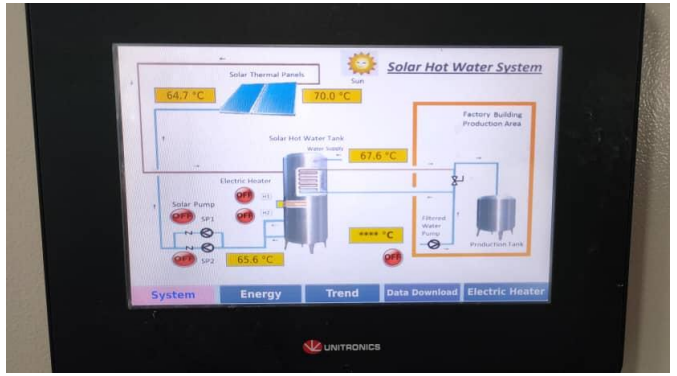
SOLAR THERMAL SYSTEM AT SITE

Item	Parameter	Unit
Energy	200	kWh/day
Tank	4,000	liter
Collector area	76.8	m^2
Type Collector	Flat Plate (PFW21)	
No of Collector	40	Panel
Supply Temperature	75	^0C
Process Temperature	70	^0C

Solar Thermal System Specifications

40 solar thermal panels installed on roof top

4000L heated water tank



Monitoring system (indoor)

PROVEN OUTCOME

Reduction in electricity usage

Productivity improvement

BEFORE		AFTER	
Annual electricity		**Annual electricity**	
Usage	54,100 kWh	Usage	27,050 kWh
Cost	RM27,340	Cost	RM13,670
Process	**Time (Min)**	**Process**	**Time (Min)**
Heating	30	Heating	Nil
Mixing	15	Mixing	15
Filling	15	Filling	15
Packing		Packing	
Total	**60**	**Total**	**30**
Daily Production		**Daily Production**	
Operation	8 hrs	Operation	8 hrs
Max batch	8	Max batch	16

Total Investment: RM188,580

Annual Savings: RM27,340/yr *(including productivity improvement)*

SPB : 6.89 years

SPB: 5.5 years (with UNIDO 20% Grant)

SYARIKAT AMEEN SDN BHD

Sejak 1982

Syarikat Ameen Sdn. Bhd

Established: **1982**
Main product: **concentrates and flavored cordials**
Turnover 2014: **RM3 million**
No of employees: **10**

Technical Issues/Problems:

- Need to install new electric steam boiler
- Need to upgrade power line from utility and need to spent their own cost
- Cost new boiler(34kw) and heat exchanger RM 93,000.00

Solution

Installation of solar thermal hot water by alternative using electric boiler

Outcome

- **Electricity reduction**: 100%
- **Economic savings**: at least 50 % reduction in expenditure for electricity (RM54,000/year)
- **Environmental effect:** 122727.27 kWh/yr, 90.94 ton CO2e/yr
- Payback: 4 yrs

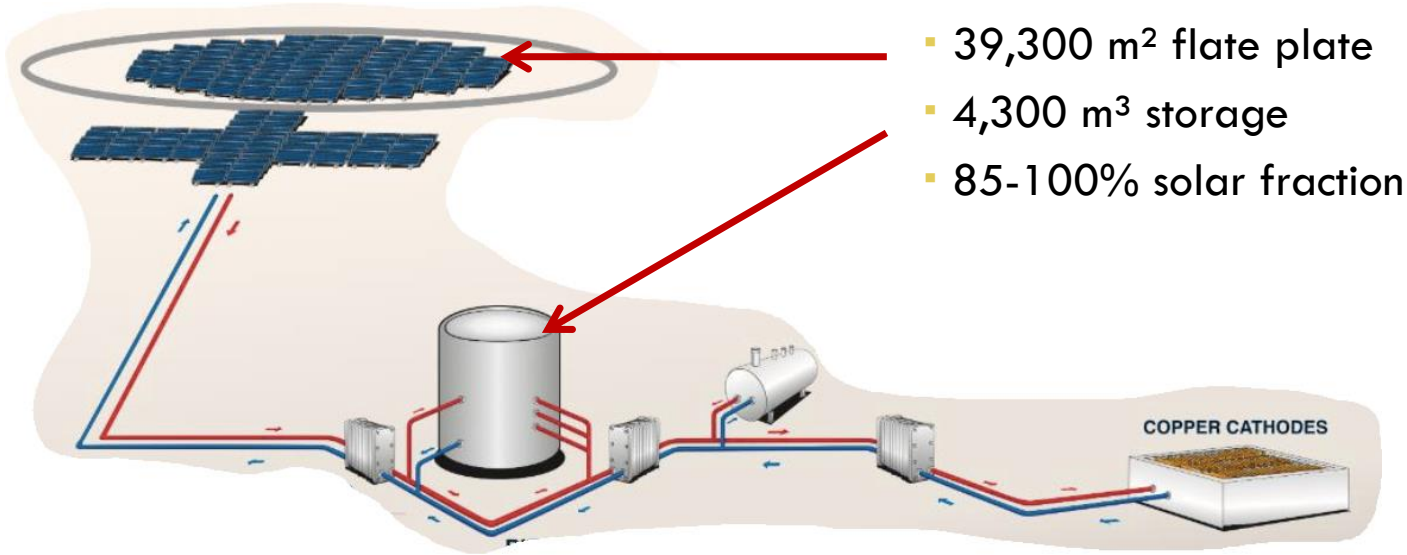
propose using New boiler

Now Solar Thermal

CASE STUDY: CODELCO CHILE

- **Process**
  - Electro winning process
  - Keeping electrolyte at constant 50 °C
  - + cleaning processes

System
- Sunmark
- 39,300 m² flate plate
- 4,300 m³ storage
- 85-100% solar fraction

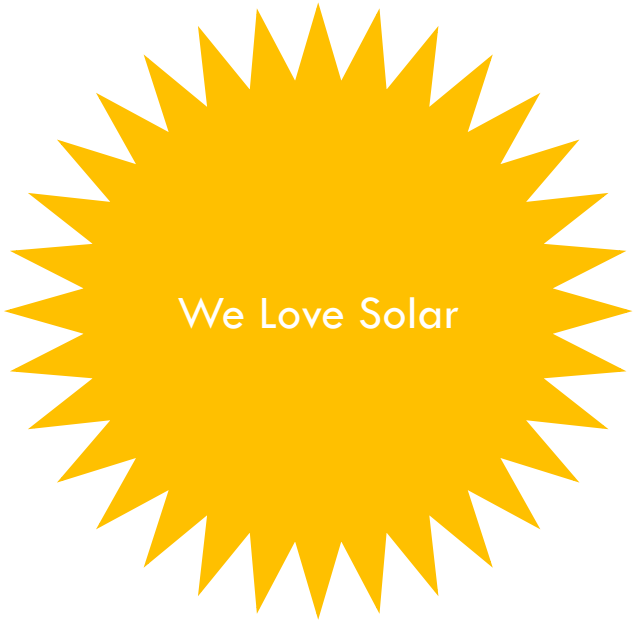


CASE STUDY: CODELCO CHILE

Source: Sunmark

SOLAR THERMAL: SUMMARY

- Works year-round, even on cloudy days
- Low-maintenance costs
- Systems last an average of 20 years
- The technology is stable and mature
- Helps reduce the use of non-renewable fossil fuels
- Reduces emissions that lead to global warming
- Increases the value of homes and businesses



Source of pictures: AEE INTEC

THANK YOU

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