Development of a Technical Directory for Major Industries and Buildings for ASEAN Member Countries

Seminar on the Promotion on Energy Efficiency and Conservation (PROMEEC) Industry in Southeast Asia
Thailand, 17 November 2006

Development of a Technical Directory

Phase 2 of PROMEEC Activities

Implementation of Energy Audits and Recommended Improvements in Each Country

- •Follow Up Survey to Find Actual Status
- •Study on Barrier and Measures
- •Consulting for Implementation

Dissemination of Technologies and Practices

- **•Preparation of Technical Directory**
- **•Establishment of Database**
- **•Workshop for Dissemination**

Development of an “ASEAN Energy Management System”

Why Develop a Technical Directory?

- Introduce and promote technologies and best practices on EE&C available in the world and in ASEAN
- Encourage further investments in technologies and best practices
- Help create the market
- Promote a culture of increased efficiency
  - Savings
  - Employment
  - Environmental Protection

The Technical Directory

- Designed to be user friendly
- Available for all users as it is web based
- Displays a wide coverage of technologies and best practices
- Updated regularly
- Open for expansion

Contents of the Technical Directory

- Overview of Technology or Practice
  - Name of Technology
  - Energy Source/Practical Use
  - Outline and Effects
- Technical Description
  - Principle
  - Features
  - Mechanism
- Successful Cases
  - Energy Saving and Cost
  - Companies/Organizations

Status of Compilation

- 50 Technologies for Industries
  - Operation
  - Heat exchange
  - Machinery and equipment
  - Energy saving equipment
  - Welding
- 33 Technologies for Buildings
  - Operation
  - Regulator
  - Air conditioning
  - Electricity
  - Steam drain
  - Lighting improvement

Technologies for Industries

Application of Heat Pumps to a Fractionator
Boiler Re-circulation scrubber pump
Capacitor
Caustic soda production process, Brine electrolysis heat recovery line preheater
Caustic soda production process, Energy-saving ion-exchange membrane electrolyzer
Caustic soda production process, Improvement of active cathode for ion-exchange membrane method electrolyzer
Caustic soda production process Reduction of electrolytic electricity of brine electrolyzer
Circulating Fluidized Bed (CFB) Boiler Technology
Clean Boiler Waterside Heat Transfer Surface
De-inking Module Pumps
Development of Energy Conservation Technology for Manufacturing Plastic Products through Process Omission
Development of Energy Saving Distillation, Technology through Internal Heat Exch.
Development of Fundamental Technologies for Next-Generation Satellites
Development of Welding Technology of Steel Conservation Structures for Energy
Energy saving improvement of blowers and pumps
Energy saving of vacuum pump for paper-making machine
Fan Pump Impeller

Technologies for Industries

Heating Furnace Using Regenerative Burner
The integrated gasification combined cycle (IGCC) produces electricity from a solid or liquid fuel
High efficiency dehydrator for dryer of paper-making machine
High efficiency inverter driven screw compressor
Improvement of vacuum condenser
Improve Your Boiler's Combustion Efficiency
Installing power recovery turbines for heavy fraction oil hydro cracking plant
Install Removable Insulation on Valves and Fittings
Introduction of clinker pre-grinding roll crusher (Cement Production Finishing Section)
Ladle heating apparatus with regenerative burners
Overhead Vapor Chiller System
Power and Steam Balance System
Power receiving/transforming equipment
Primary Fan Pump Motors
Recover Heat from Boiler Blow down
Reducing excess air through modification to furnace dampers
Semiconductor Application Chip Project
Sensors for Smart Controller and Transfer Pump Motor Controller
Use Low-Grade Waste Steam to Power Absorption Chillers

Technologies for Buildings

Absorption Chiller
AC equipped with heat pipe
Use of water chilled in cooling tower during winter to cool telecommunications equipment rooms
Adjustment of air ratio in Boiler
Automatic Operation Control for Escalator
AVR with load management system
Building Automation System (BAS
Cogeneration System
Control of outlet temperature of cold water from chiller depending on the season
Control of the number of Elevators operating during nighttime
Daylight sensors' on-and-off control of lights near the windows
Diversion of emergency power generator to co-generation equipment
Drain water heat recovery
Energy Saving Module (Abbotly)
Environmental Energy Utilization System
Light Save (LSA2000B)

Technologies for Buildings

Outdoor Air Cooling
High-efficiency Gas Fired Air Conditioning System
Installation of inverters to cold water pumping system
Installment of automatic controllers to ducts of individual rooms
Insulate Steam Distribution and Condensate Return Lines
Placing of water saving type valve disc
Process Heating System
Repair and maintenance of cooling tower
Reflector Light
Segmentation of lighting circuit
Solar Photovoltaic power generation
Technological Development for a Small, Highly Efficient Natural Gas Co-Generator
Test for Pumping System Efficiency
Variable speed drive on Air Conditioning System chilled water pump and condenser
Water Cooled Evaporative Air Conditioning
Water saving

Examples in the Technical Directory

Buildings

TECHNICAL DIRECTORY

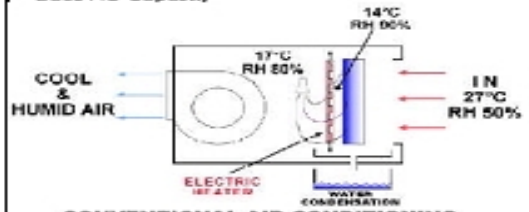
Buiding 2.2		
Industry classification Buiding / ALL	*AC equipped with heat pipe*	Energy Source Electricity
Technology Classification Operation AC		Practical Use 1999

Outline

Air Conditioning unit equipped with heat pipe specially designed for Tropical Climate
(Tougher than Sub Tropic)
The Climate Difference
- Sub Tropic
  - Hot and Dry
  - Low wet B
- Tropic
  Hot and humid

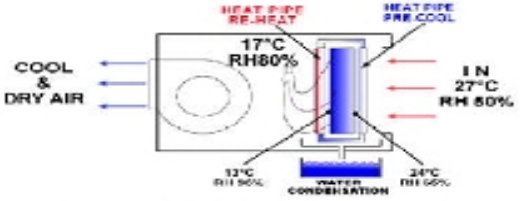
Principle & Mechanism

Conventional Type (AC + Heater)
- Consume electricity for heater
- Base AC Capacity



CONVENTIONAL AIR CONDITIONING WITH HEATER

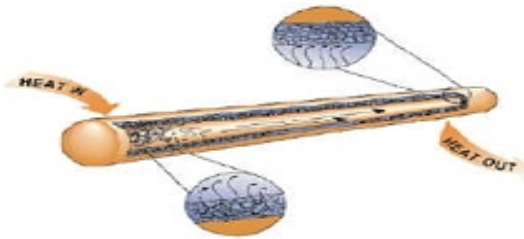
A C equipped with Heat Pipe
- No electricity for heater
- Smaller AC Capacity



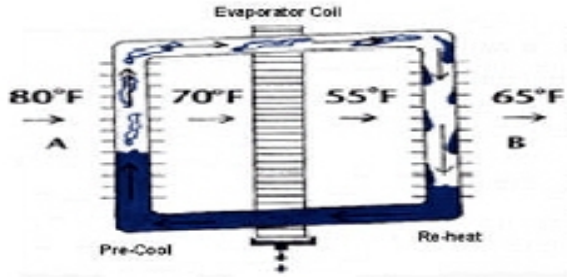
AIR CONDITIONING WITH HEAT PIPE

Structure explanation, shapes, and/or System diagram

Principle of Heat Pipe
In one end part coolant absorbs heat and evaporates,
in the other end,coolant dissipates the heat and condenses



The Use of Heat pipe in AC
Hot and humid outer air is pre-cooled by heat pipe.
Dehum idified and undercool



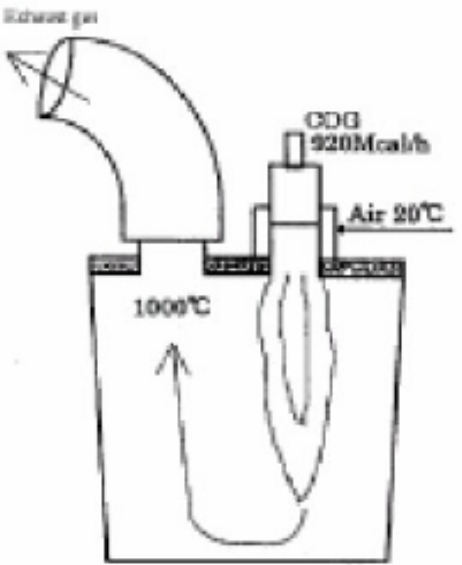
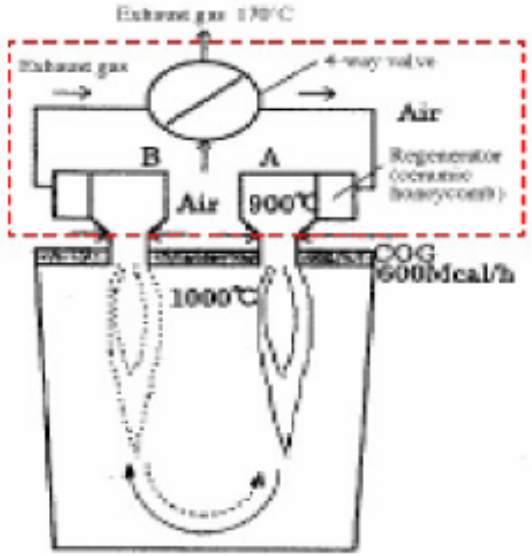
Examples in the Technical Directory

Effectivness of the improving measure	AC Equipped with Heat Pipe used in Tropic Climate • Comfort Zone SNI can be maintained. • AC Capacity can be reduce by 15~20%. • Operation cost can be reduce by 20~30%. • Room RH can be controlled <60%, to prevent the grow of Fungi and Microorganisim.
Energy saving	AC Capacity can be reduce by 15~20%
Green House Gas reduction (except C02)	Possible reduction correspondent to the reduction in electric power at power plants
Cost	0 (About the sam e as conventional AC)
Economical effectiveness (benefit and cost)	Operation cost of AC (In case of 1HP (1kW)) (Preconditions) Operation tim e : 15 hours/day, 300 days/year, Electric Power Cost : Rp.500/kW h (US$0.055/kW h) (Operation cost) 1kW x 15h/d x 300d/y x Rp. 500/kWh (US$0.055/kWh) Rp. 2,250,000.-/year (US$22)
Note	• Contacts for further information Ir. John Budi Harjanto Listijono M .Eng.Sc Universitas Katolik Indonesia ATM A JAYA, Fakultas Teknik Jurusan Teknik Mesin PT Metroplitan Bayu Industri

Examples in the Technical Directory

Major Industries
Iron & Steel

Industry - 1.27		
Industry classification Iron & Steel	***Ladle Heating Apparatus with Regenerative Burners***	Energy Source Fuel
Technology Classification Machinery & Equipment		Practical Use 1990

Outline	By incorporating regenerative burners into the apparatus to heat the refractories of a ladle which receives motion steel, a large energy saving is achieced. It also prolongs the life of the ladle refractories
Principle & Mechanism	A regenerative burner system is occupied of a pair of burners which burn alternately for a determined time period and function as a exhaust duct while not burning. The heat of the high temperature exhaust gas is stored in the regenerator installed just after the burner, and the stored heat is used for preheating the combustion air
Description	Heat efficiency is as low as about 30%. Since the high temperature exhaust gas is discharged without waste heat recovery. In addition, the temperature distribution inside the ladle is uneven. / By installing a regenerative burner system, the combustion air temperature of about 900°C the exhaust air temperature of 170°C, and the heat efficiency of 30% are obtained. In addition, the variation in the temperature distribution inside the ladle is improved to the level of less than about 30°C.
Structure explanation, shapes, and/or System diagram	 

Examples in the Technical Directory

Energy Saving effect	Fuel saving of 56% correspond to montly consumption of 573 x 10^3 Kcal, Increase of electric power consumption by 239 x 10^3 Kcal per month
Economics Equitment Cost	Investment amount : 24 million yen Improvement effect : 10 million yen/year Investment payback : 2 - 3 years (excluding the refractory life)
Remark	As this apparatus has the automatic heating temperature control function, fuel consumption during working is reduced as well.
References Energy Saving, Vol 50, no 2, p 26 - 32 1998	Inquiry ECCJ

Sources of Information

Reports of Energy Audits in Major Industries

Cement	Food
Pulp and Paper	Textile
Steel and Iron	Petroleum Refinery
Caustic Soda	Garment
Hydro Power Generation	Ceramics / Porcelain

Reports of Energy Audits in Buildings

Researches (i.e. ECCJ, NEDO, ASEAN organizations)

We welcome information/inputs from you!!!

Thank you very much
for your kind attention!!!

http://www.aseanenergy.org