WELCOME

ENERGY AUDIT TEAM & AUDIENCE

BANGKOK STEEL INDUSTRY PUBLIC CO., LTD.

BSI LOCATION

27 M.10 Poochaosamingprai Rd.

Phrapradang , Samutprakarn

10130, Thailand

Tel : 02-754-4617

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BANGKOK STEEL INDUSTRY PUBLIC CO.,LTD.

- **(1964) Company establishment re-rolling steel mill (Capital 70 M Baht)**
- **(1973) Started manufacture steel bar 25 MT (E.A.F system)**
- **(1978) Major shareholder by Metro company Limited**
- **(1983) Join venture with Nissho Iwai Corp. and Nomura Trading Co., Ltd. to Manufacture galvanized iron steel sheet (C.G.L #1)**
- **(1991) Registered in the Stock Exchange of Thailand**
- **(1992) Constructed C.G.L #2 and C.C.L (Prepainted galvanized steel)**
- **(1993) Installed additional 25 MT E.A.F and new Rolling mill factory R.M #1**
- **(1994) Transformed into public company limited by shareholders Meeting Approval (Capital 40 M Baht)**
- **(1996) Constructed another rolling mill R.M #2 and new factory in Nakornrachasima**
- **(1997) Constructed another new Galvanized steel C.G.L #3 in Nakornrachasima**

BSI: MAJOR PRODUCTS

CONCREAT REINFORCED STEEL

:

DEFORM BAR

&

ROUND BAR

GRADE: SR 24, SD 30, SD 40, SD 50

SIZE: RB 6, 9, 12, 15, 19, 25, 28

SIZE: DB 6, 12, 16, 20, 25, 28, 32, 40

BS I

: Melt Shop

(EAF 25 T. x 2)

: Rolling mill

(Hot Roll 50 T/h , 70T/h)

Electric Arc Furnace (EAF)

Scrap Loading

Bucket, Weighing

Charging to EAF

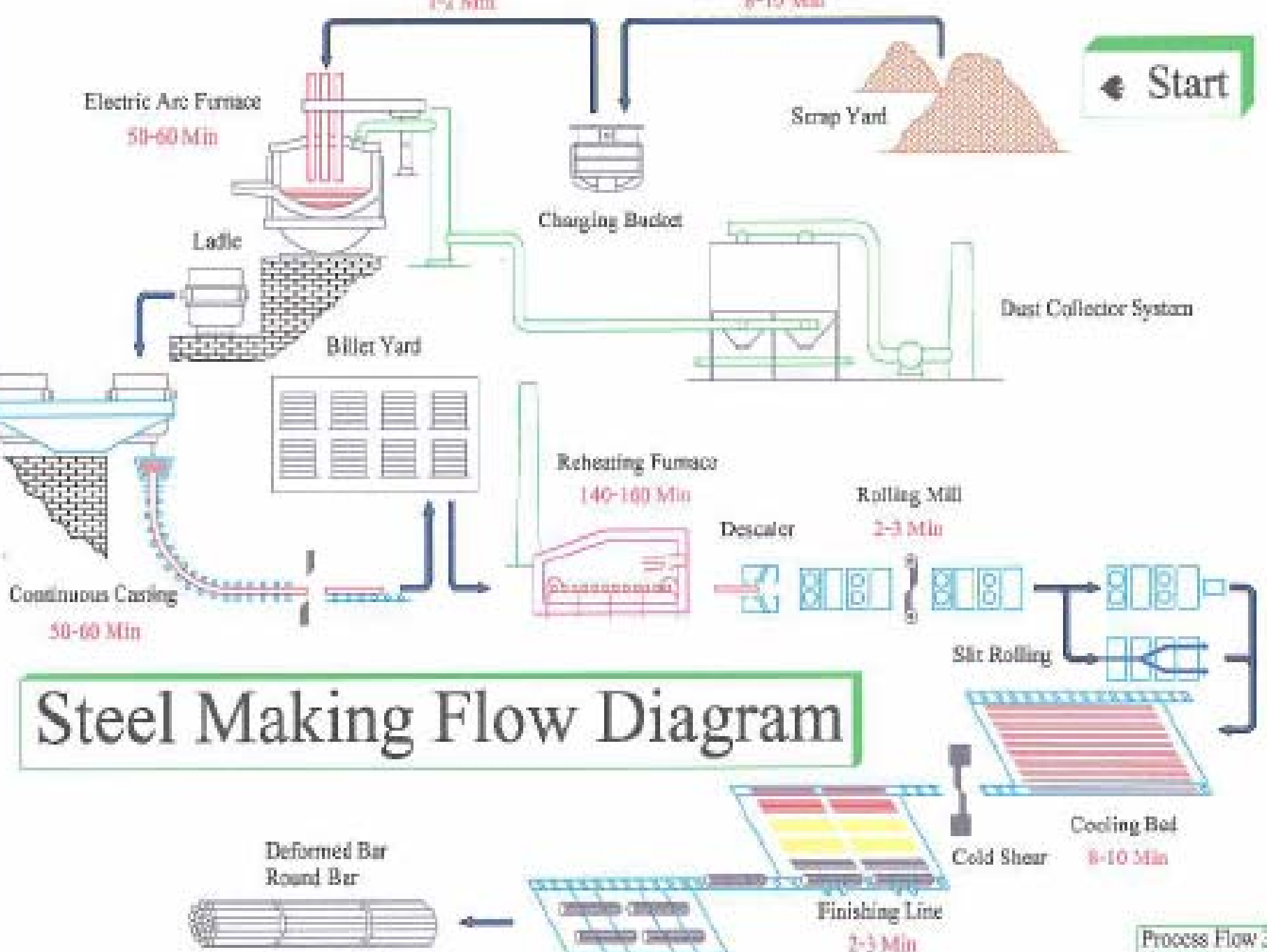
EAF Melting
1,550℃

Sample test

Chemical Adjust

Slag taping

Taping to L/D


Start
Scrap Yard
Electric Arc Furnace
50-60 Min
Charging Bucket
Ladle
Billet Yard
Dust Collector System
Reheating Furnace
140-160 Min
Descaler
Rolling Mill
2-3 Min
Continuous Casting
50-60 Min
Slit Rolling
Steel Making Flow Diagram
Cooling Bed
8-10 Min
Cold Shear
Deformed Bar
Round Bar
Finishing Line
2-3 Min

Continues Casting Machine (**CCM**)

L/D Send to CCM

Casting

Cooling

Billet ⌀130

Cooling Bed

Ware house

ROLLING MILL (RM)

Push Billet to RHF 1,150℃

Discharge to Roll Stand

Rolling (Roughing Intermediate, Finishing)

Forming and Marking (Finishing Stand)

Cooling

Cutting to Order

Tying & Tacking

Ware house

Energy

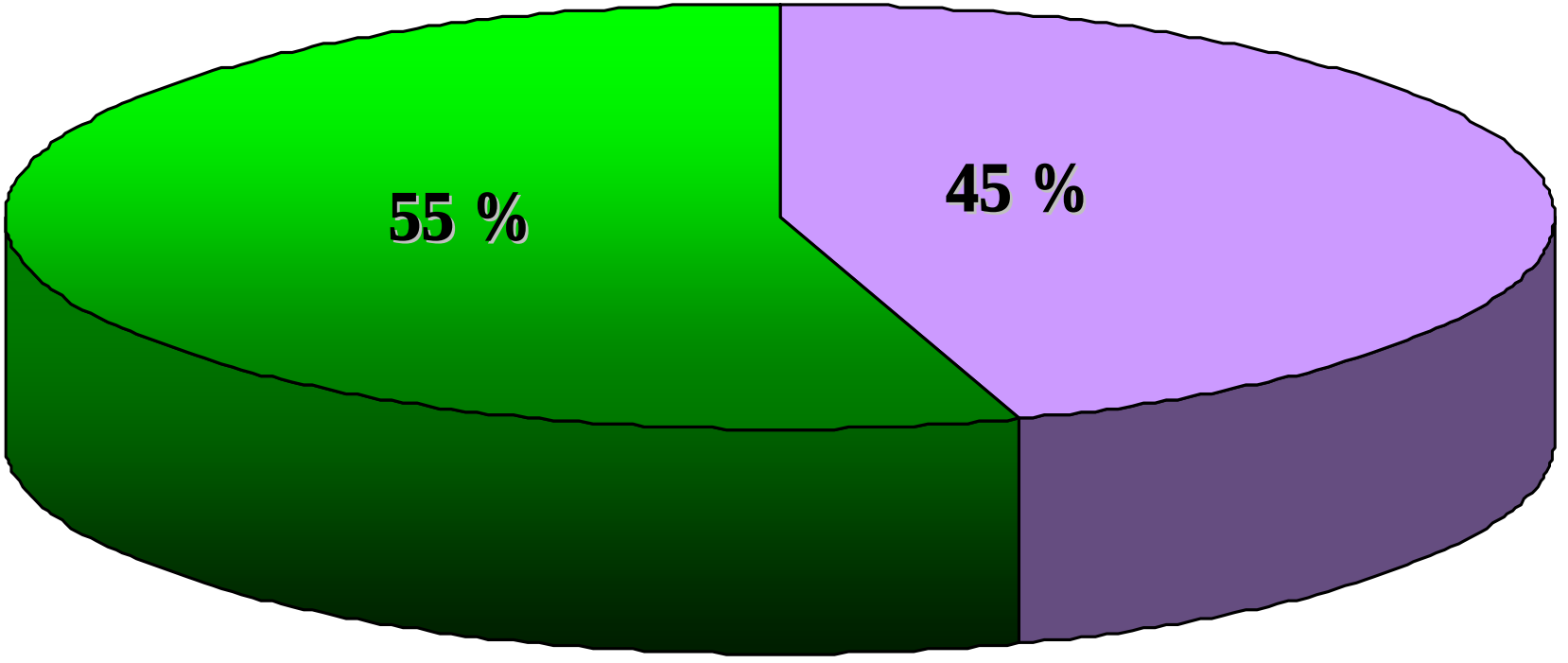
Top Management Policy:

Encourage to energy conservation and follow the ministry of energy's policy

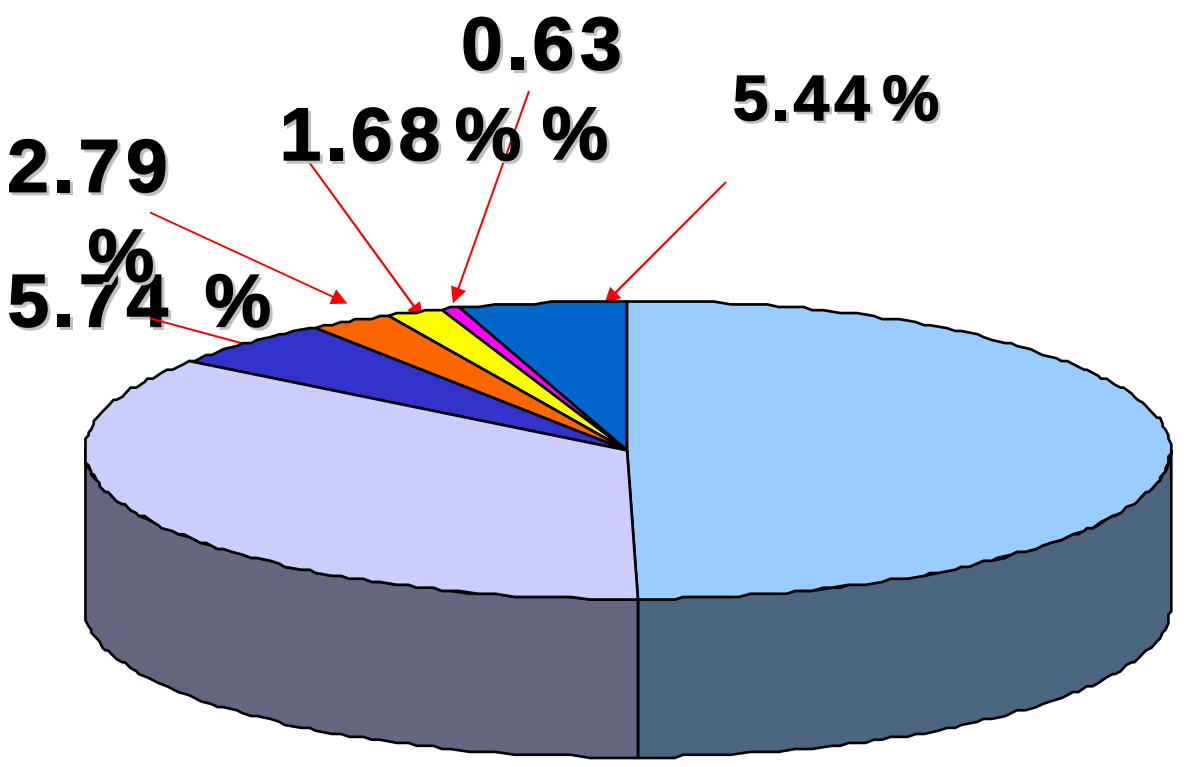
BSI Energy Committee

บริษัท กรุงเทพผลิตเหล็ก จำกัด (มหาชน)

BSI Energy

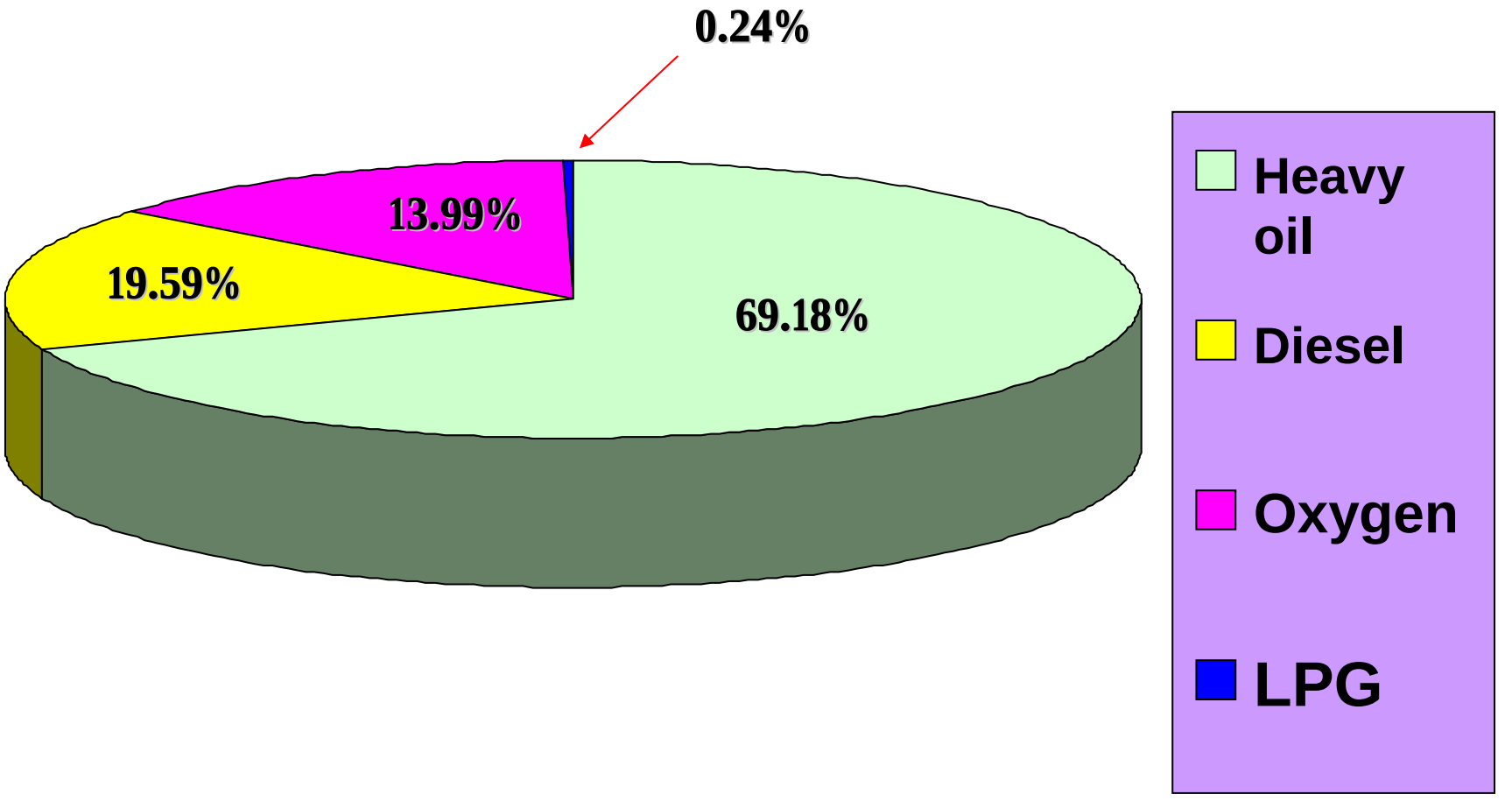


BSI Energy (Electric Energy)

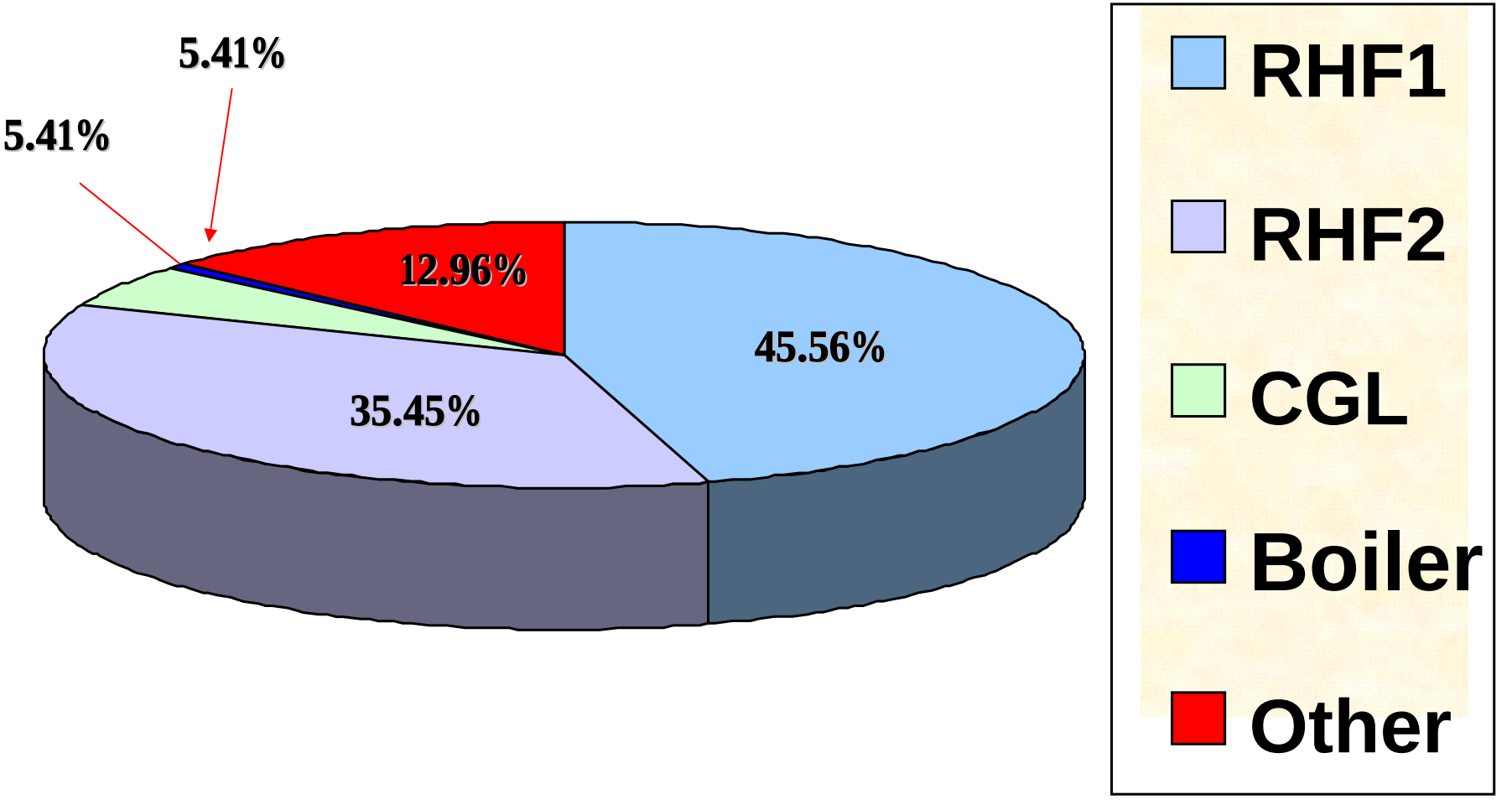


- Electric Arc furnace
- Motor (> 20kW)
- Cooling system
- Air compressor
- Air conditioning
- Lighting system
- Other

BSI Energy (Heat Energy)



Heavy Oil



Implementation Example for Energy Conservation

1. Implementation of lighting system

RM. Roof

Original: Metal sheet

Modified: Transparent sheet in some section

Saving: 177,870kWh/y

Saving: 425,000Baht/y

Budget: 423,330Baht

2. Implementation of cooling tower

RM. Cooling tower

Original: Aluminum fan (10.6kgs/paddle
Motor load: 23.7A)

Modified: Glass fiber (6.1kgs/paddle
Motor load 16.3A)

Saving: 7.4A = 1628W × 3sets

Saving: 80,077Baht/y

Budget: 35,000 × 3sets = 105,000Baht

3. Implementation dryer of QTB

RM. QTB

Original: Used power 24h ✕33kW = 792kWh

= 546,480Baht

Modified: Used power (1min ✕ 900bar/day x 33kW)/60min = 495kWh

= 341,550Baht

Saving: Compress air pipe 10mm. diameter at 7bar

using the power 33kW Speed a bar passing

the QTB consumes is 1min

Saving: 204,930 Baht/y

Budget: No budget

4. Implementation gate of RHF

Original: The gate size at open position is 350 ✕ 700mm.

Modified: The gate size at open position is 180 ✕ 700mm.

Saving: Save energy from heat lost: 43,628.87kJ/h

Saving: 7,632L ✕ 13Baht/L = 99,216Baht/y

Budget: No budget

5. Implementation of air nozzle for tying machine

Original: Air nozzle is open all the time

Modified: Control by timer & solenoid valve

Saving: Compress air pipe 5mm. diameter at 7bar using the power 8.3kW

Saving: 137,408.26Baht/y

Budget: 20,000Baht

6. Implementation of power unit for chain transfer

Original: Chain transfer use a big hydraulic pump running all the time

Modified: Small electric motor running only the bar passing

Electric motor 5.5kW × 24h × 60% running × 300day ×2.3Baht
= 54,648Baht

Saving: 442,152Baht/y

Budget: 50,000Baht

7. Replaced pinch roll and Roller conveyer by pipe conveyer

Original: Pinch roll & Roller conveyor 0.75kW ✕ 10sets

Modified: Pipe conveyor (Non use Power)

Saving: 40.5kWh (291,600kWh/y)

Saving: 670,680Baht/y

Budget: 100,000Baht

8. Implementation of roller conveyor

Original: Motor 0.75kW 40sets

Modified: Motor 0.75kW 40sets

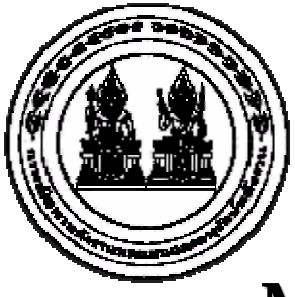
Saving: 86,940Baht / y

Budget: No budget

Implementation on the blower and bag filler, bag house of dust collector (MS)

Replaced vane type air compressor by turbo air compressor

Energy Audit In PROMEEC Team Member



Department of Alternative Energy Development and Efficiency (DEDE)

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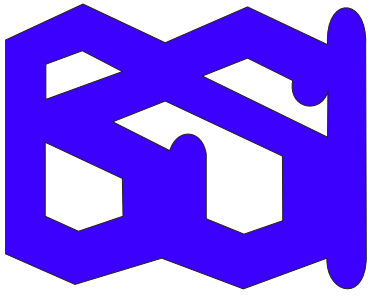
Energy Audit In PROMEEC

Team Member



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Working Step

1. Brief Company History

- Name & Foundation of Company
- Type of products, Ratio
- Capital
- Annual Sales
- Annual Energy Cost
- Employees, Technician, Engineer, Manager
- Energy Conservation Committee

2. Data Collecting

- Equipment
- Specification
- History
- Operation plan
- Working time
- Drawing & Documents

3. Annual Utility Consumption

4 - 5 years

Electricity All, Each machine		Heat Energy		Compressed Air		Water	
#	TOU , TOD	#	Fuel oil	#	consumption	#	City water
#	Partial time	#	Diesel oil	#	pressure	#	Deep well water
#	Peak time	#	Kerosene			#	Re use water
		#	LPG				
		#	Oxygen				
		#	Coke , etc.				

4. Annual Cost 4 – 5 years

- Fuel Cost
- Power Cost

5. Site Inspection

Plan for Inspection

- Specified item requires especially
- Energy conservation measures implemented so far
- High consumption machines

6. Discussion for EC measures

- In put Energy: Out put Energy
- Data Specification: Inspection
- Expected Energy saving: Investment

Energy Audit Results

Data analysis

- Energy consumption

- Unit consumption

- Specific Energy Efficiency Index

1. Reheating Furnace: Recommend to check, adjust, repair

- By Pass Valve of Air Recuperator
- Thermocouple of Air Recuperator
- Pressure Transducer (Std. + 0.3 to + 0.5 mm H_2O)
- Decrease Area of door
- Insulation (Std. wall < 100 ·c , top < 110·c)
- Oil saving 1.6%

- **Air ratio**
  - m: 1.235 (O_2 content, 4 % in flue gas)

    Std. m < 1.15 (O_2 content, 2.74 % in flue gas), Oil saving ~ 1.3 %
  - Scale loss < 2.4 %
  - Installation of gas analyzer
  - Reduction of furnace opening (Charger)
  - Reduction of door size and opening time

2. Compressed Air

- Air Leakage
- Capacity of pressure tank
- Piping Loss

3. Water pump for EAF

- Installation small pump
- Installation of Inverter
- Impeller Cutting

4. Ladle heating

- Heat recovery of waste heat of exhaust gas

5. CCM

- Ladle cover during casting
  (Low Tap temperature Saving ~ 70L/heat)
- Heat insulation of molten steel flow
  Ladle - Tundish - Mold

6. Billet yard

- Heat insulation cover for hot Billet
- Warm charge to RHF - Hot charge
  (30 - 130 ·c Saving 360kL/y)

All the Time

Start

You Ready To

Energy

Conservation

BSI Energy Conservation

Presentation by

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