Seminar on Promotion of Energy Efficiency and Conservation
(PROMEEC) for Major Industry in Southeast Asia

Energy Efficiency and Conservation Best Practices at PT. Krakatau Steel-Indonesia

Contents

- Company Background
- Energy Profile
- Energy Issues
- Energy Management & Conservation
- R & D and Future Planning
- Government Programs on EE&C
- Conclusions

PT. Krakatau Steel

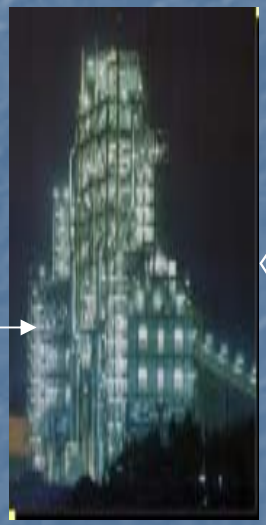
- State Owned Company (Established: August 31,1970)
- The first integrated steel plant in Southeast Asia
- Responsible for fulfill the steel demand domestic and abroad
- As a backbone of industrial development in the country
- Meet the national and international quality standard such as JIS, ASTM, DIN, ISO9001:2000, ISO 14001, ISO 17025
- Production capacity : 2.000.000 MT per year
- Supported by more than 6000 employees
- Located in Banten Province, on the westernmost of the Java Island

Production Process at PT Krakatau Steel

Pellet:

Iron ore

200,000 t/y)



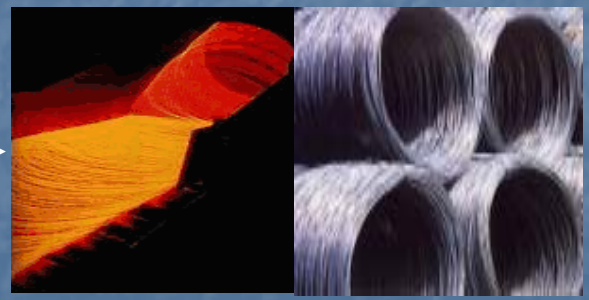
Direct Reduction Plant

Slab Steel Plant

Hot Rolling Mill
(2,000,000 t/y)

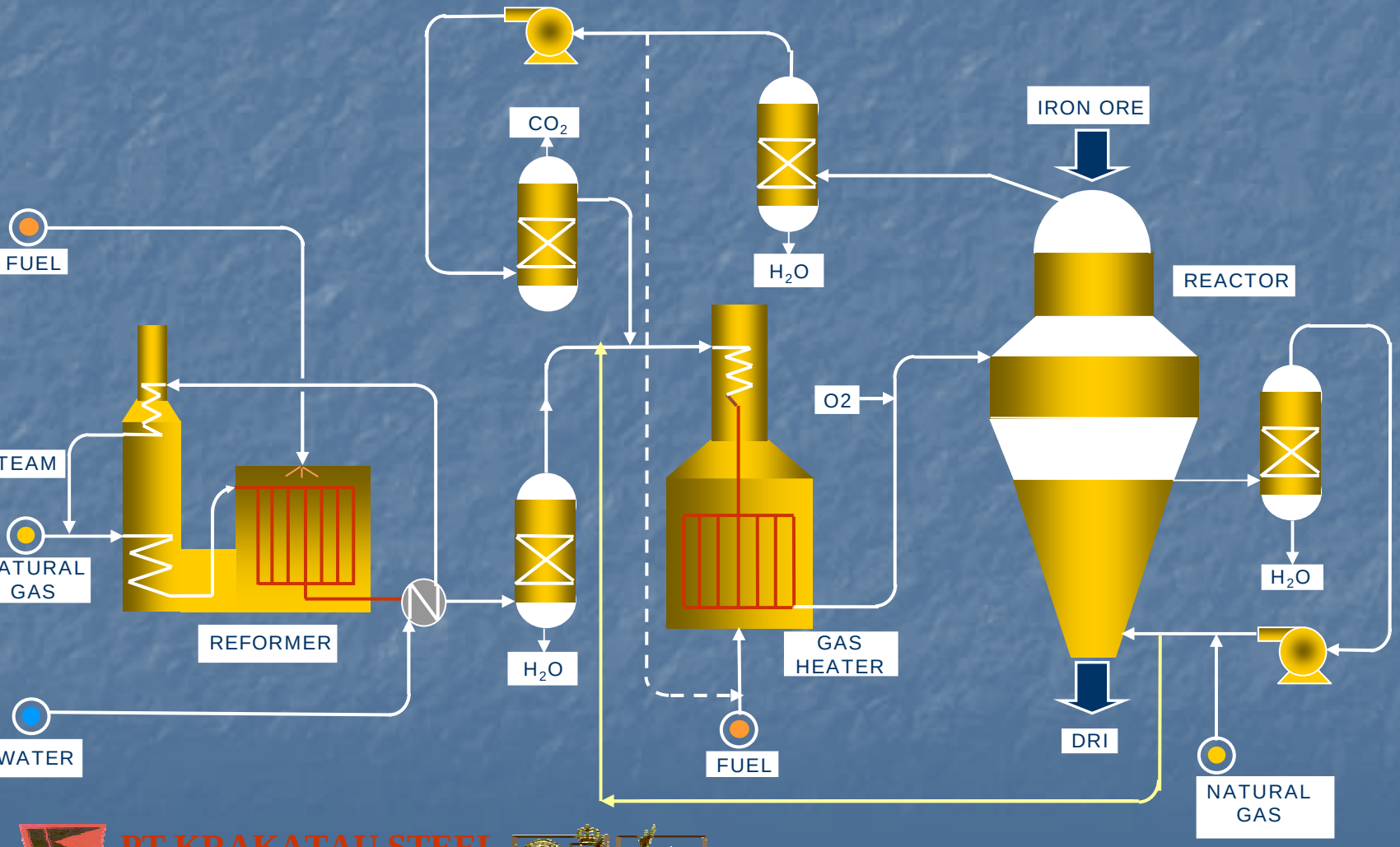
Cold Rolling Mill
(850,000 t/y)

Billet Steel Plant

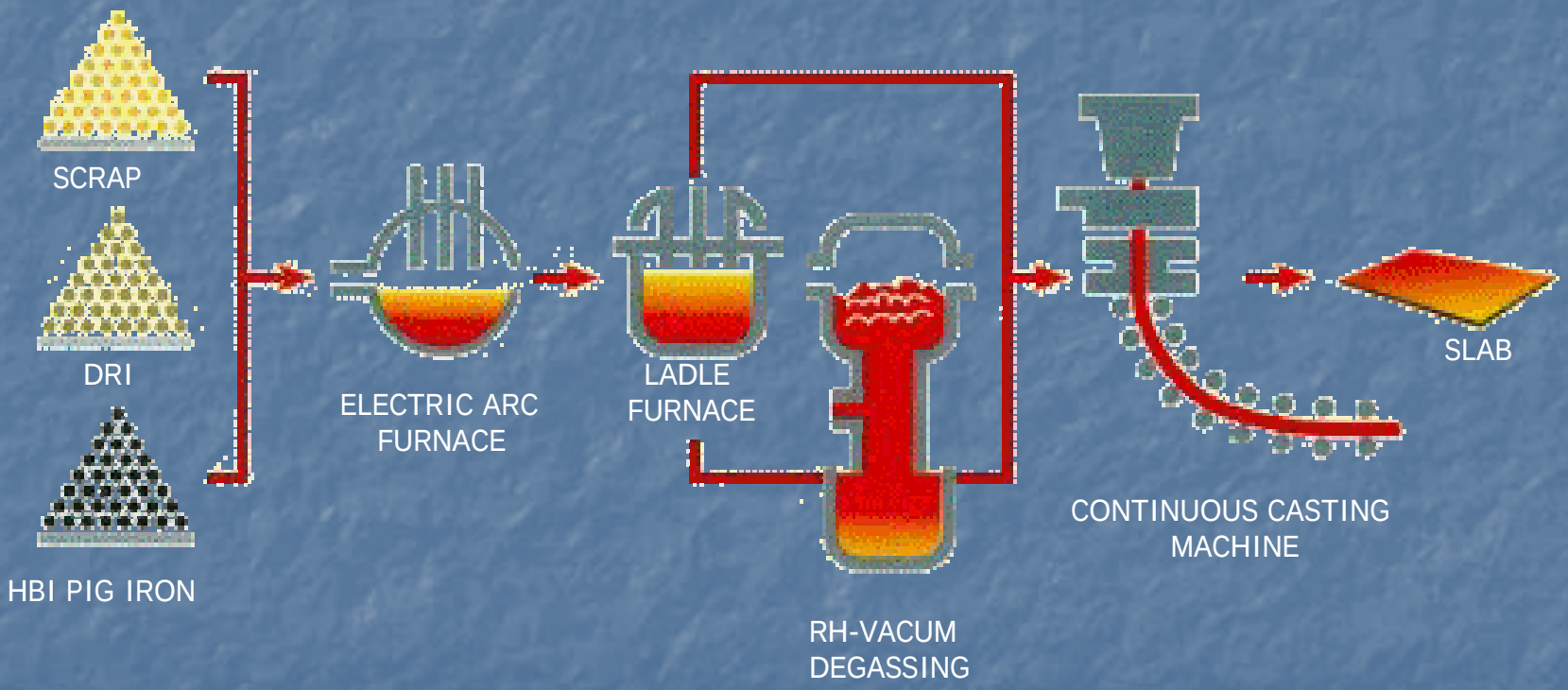


Wire Rod Mill
(600,000 t/y)

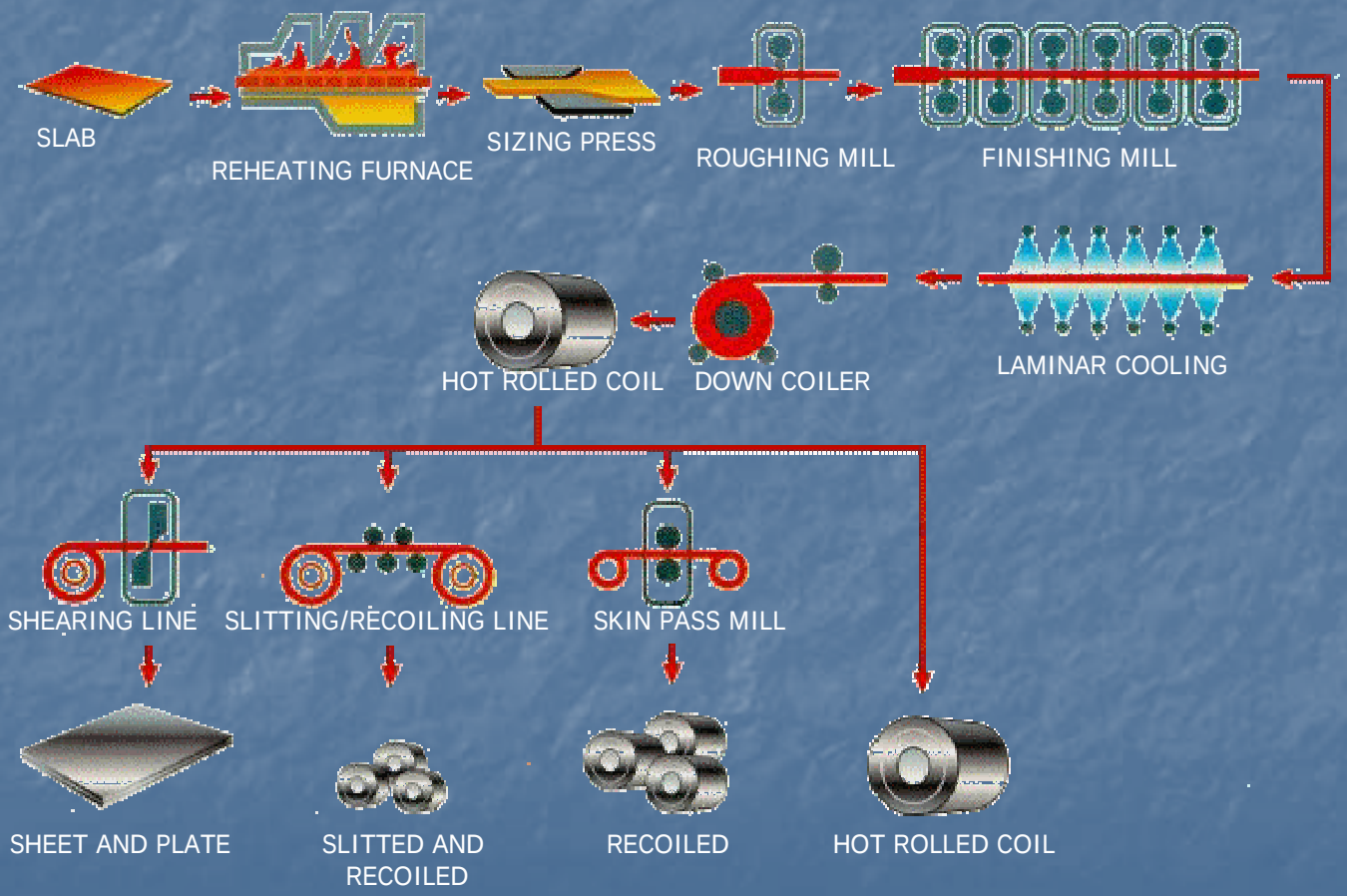
DIRECT REDUCTION PLANT



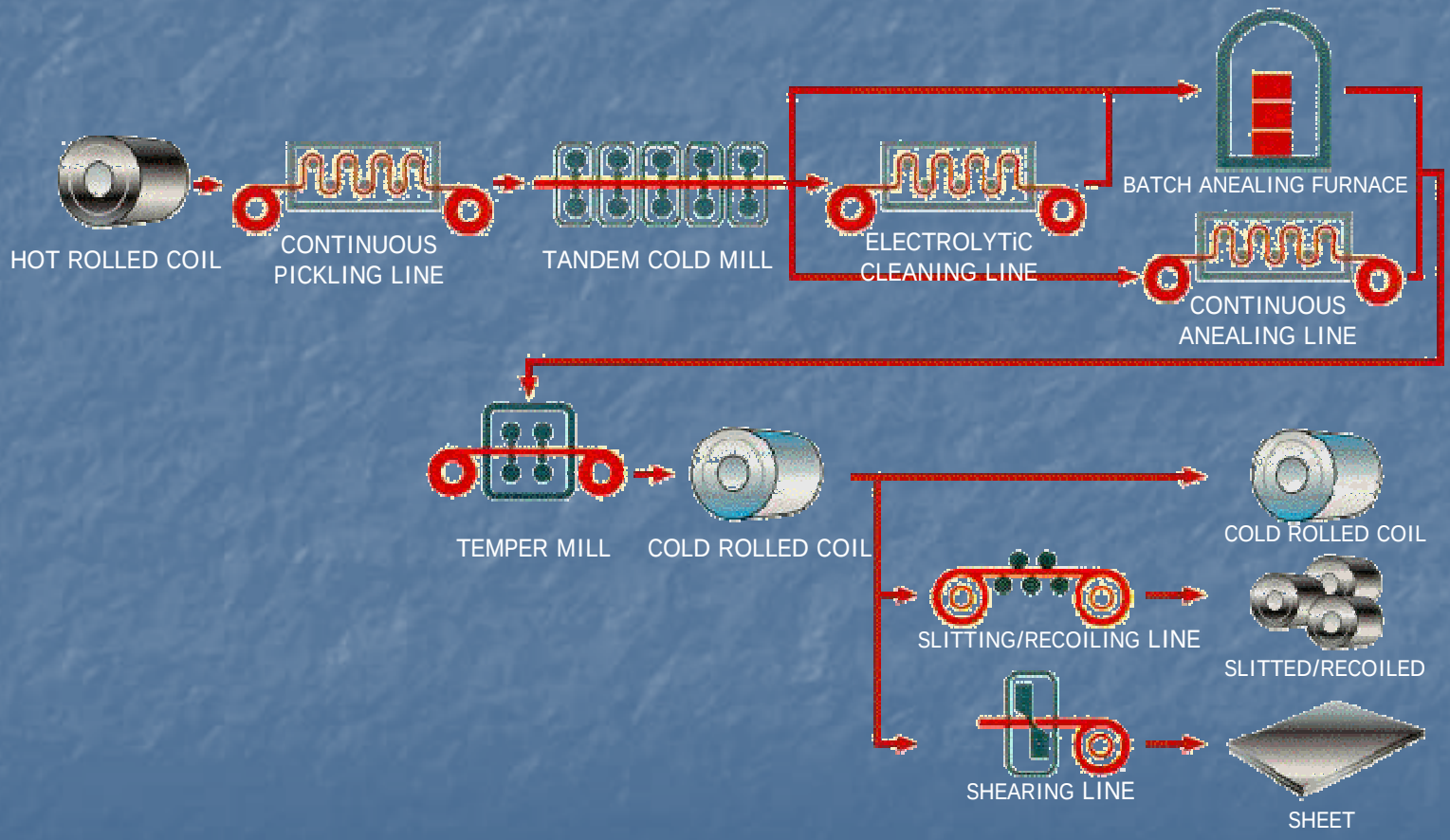
SLAB STEEL PLANT



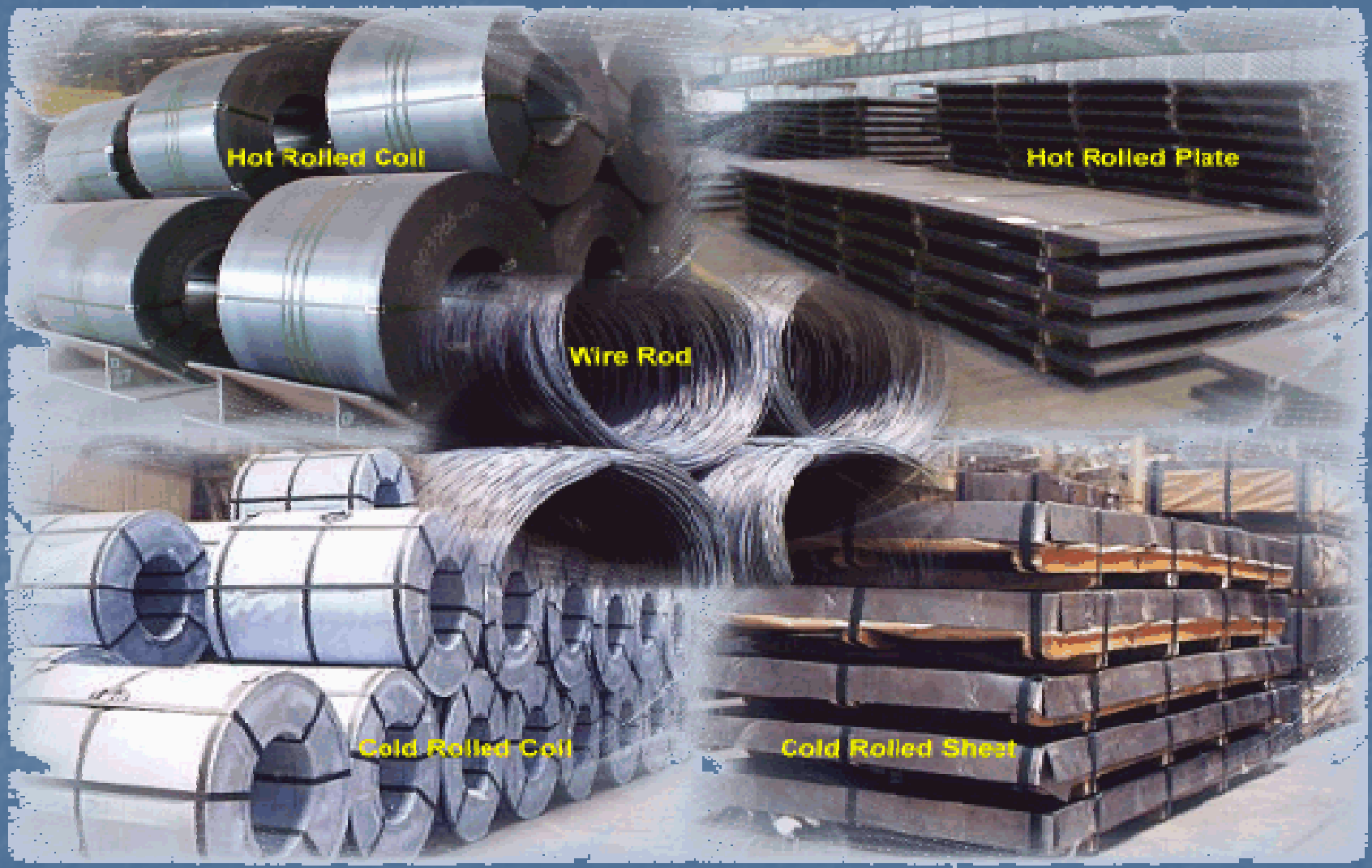
HOT STRIP MILL



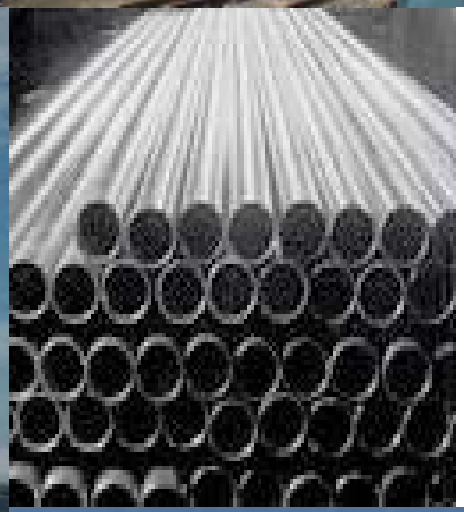
COLD ROLLING MILL



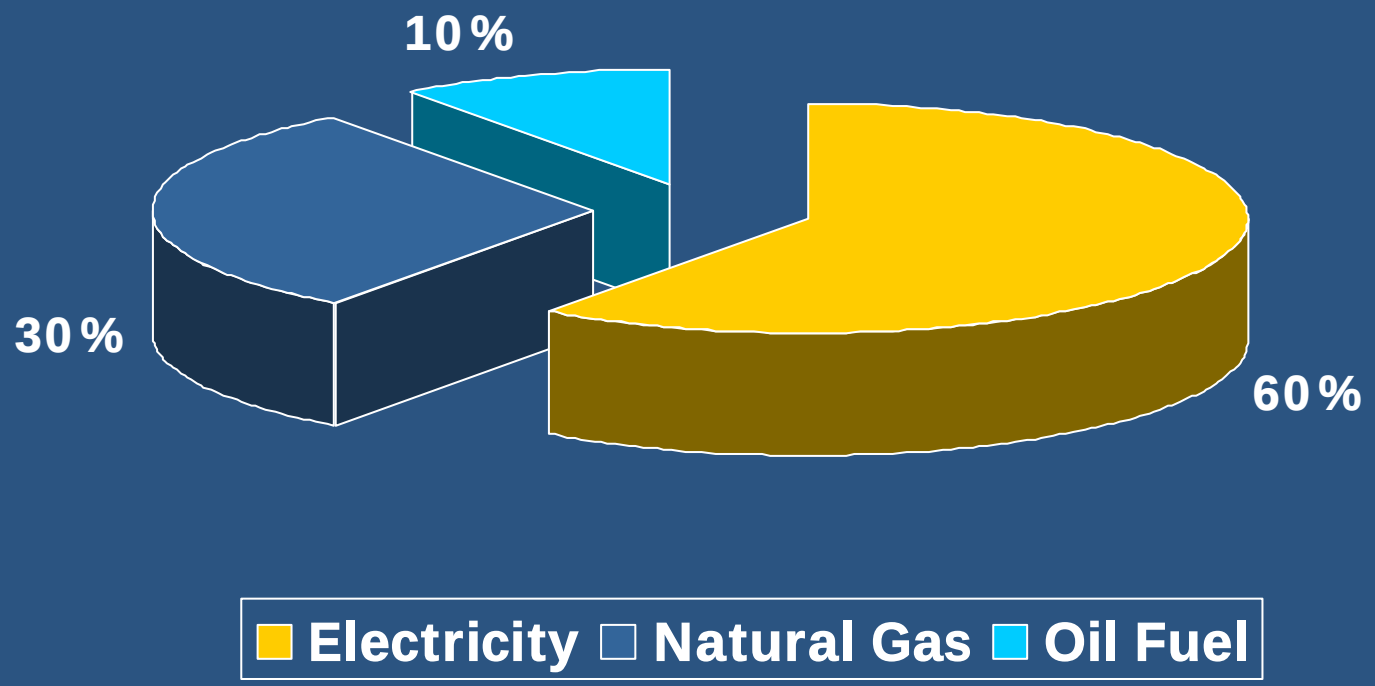
PT. K S - Products



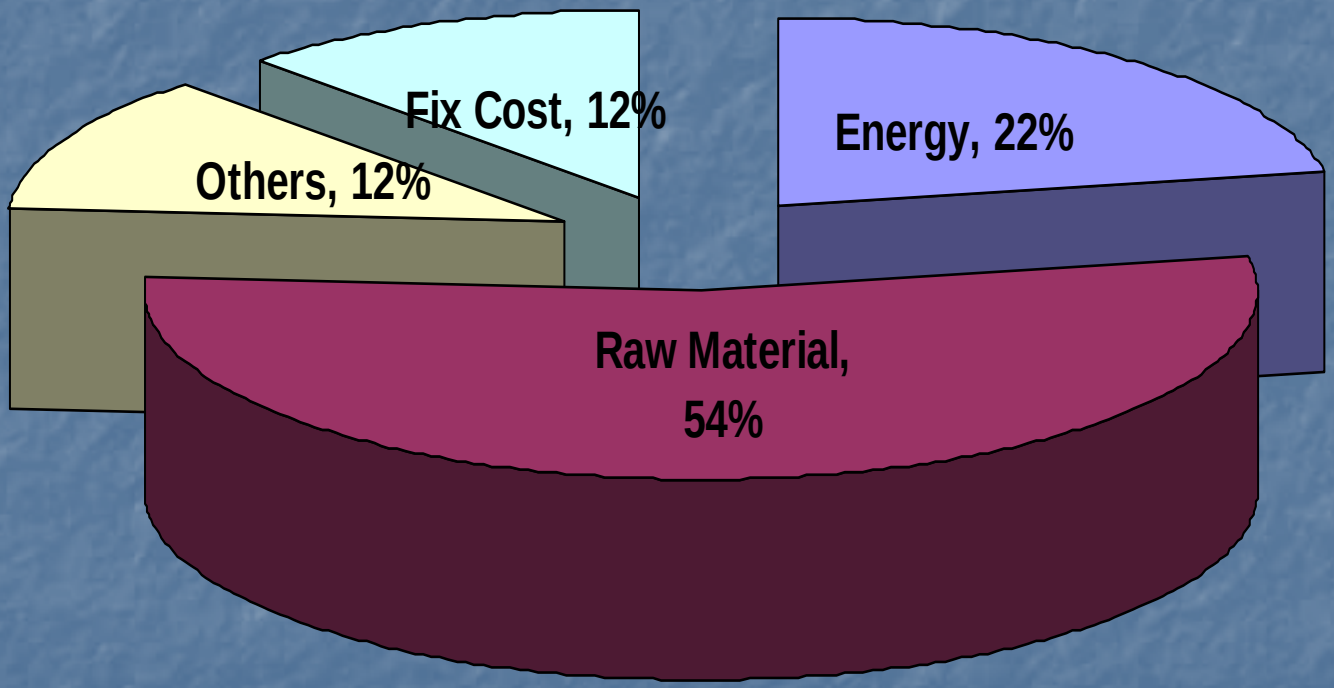
Product Applications



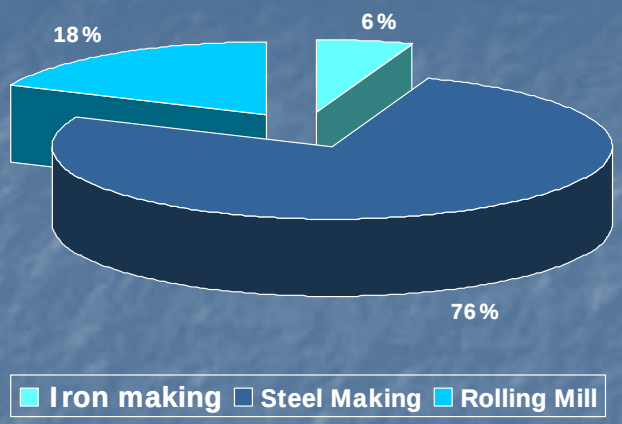
Energy Cost Segmentation at PT. KS



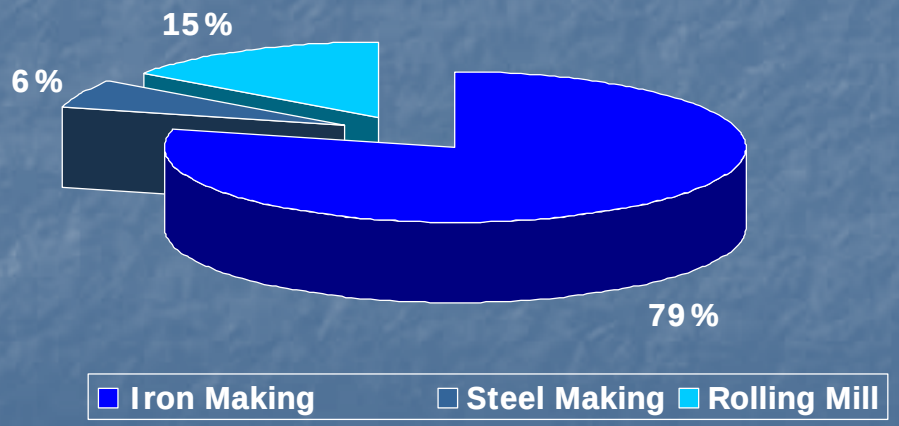
Energy Cost Structure (Crude Steel) at PT. KS



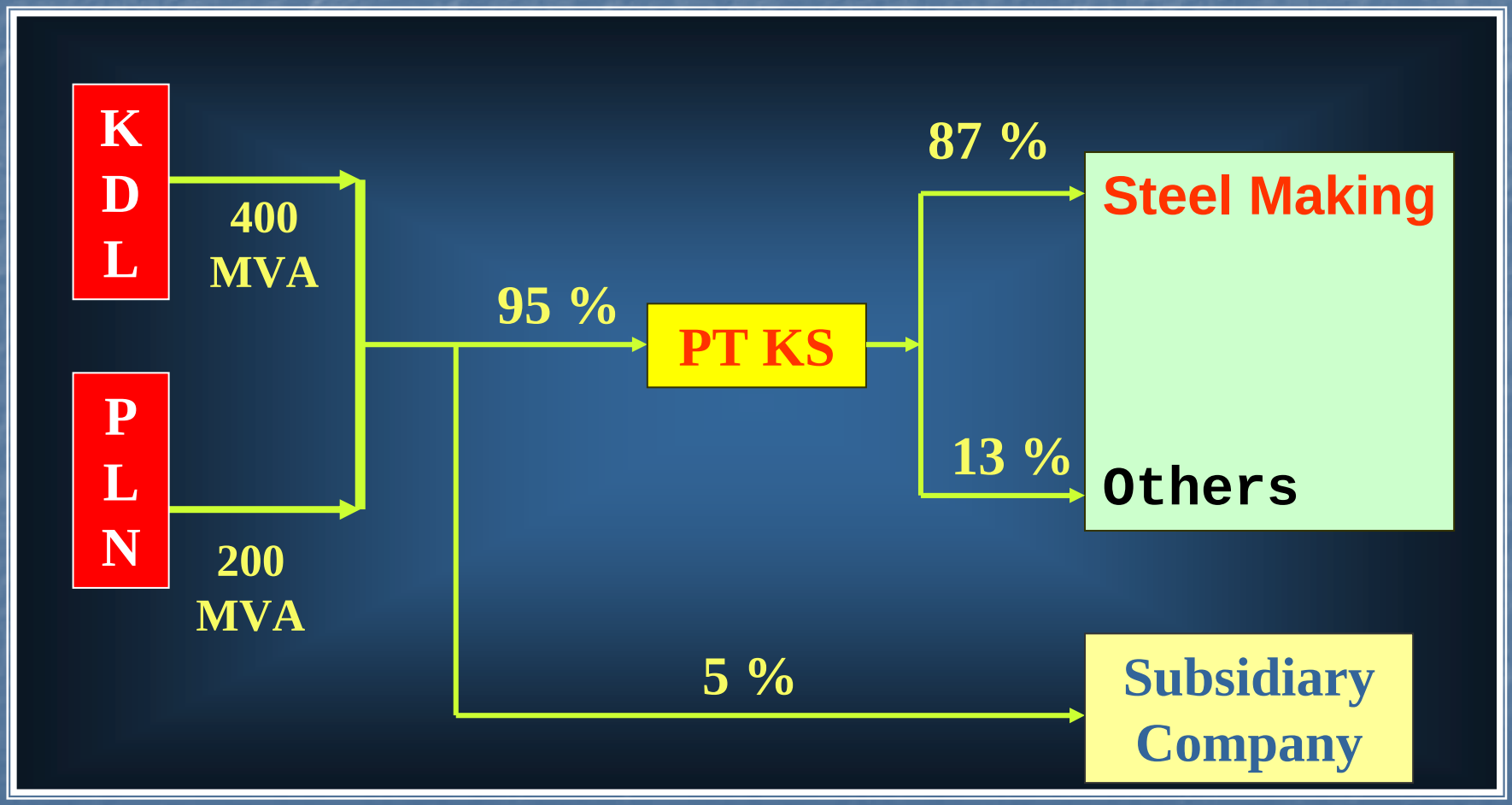
Electricity Consumption Segment at PT. KS



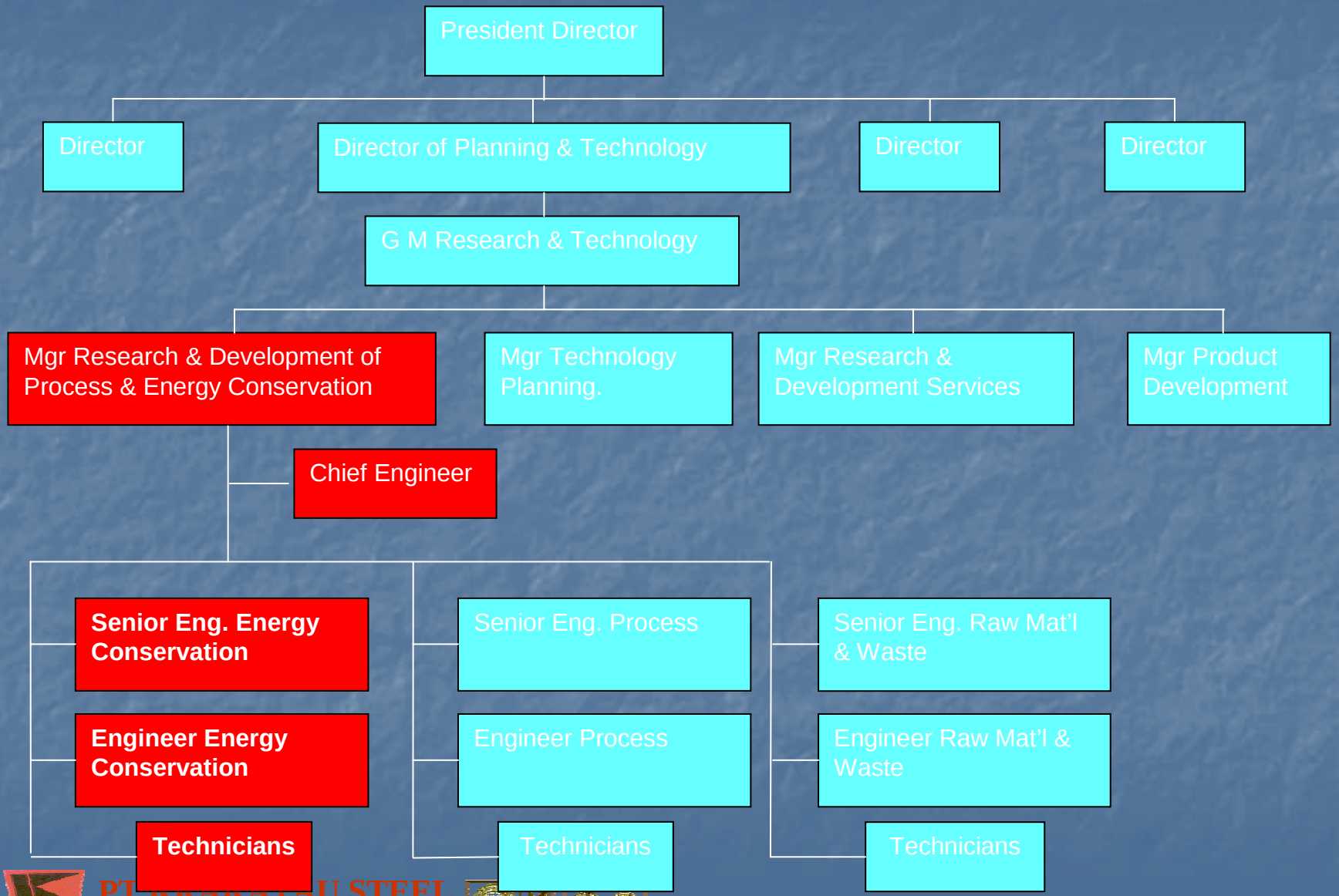
Natural Gas Consumption Segment at PT. KS



Distribusi Daya Listrik PT. KS



Energy Conservation Group Organization



Energy Issues:

- High Energy Price (especially oil fuel)
- Energy Supply Limitation (Natural Gas)
- Energy inefficiency
- Environmental Issue

Energy Saving Potential at PT. KS Plants

Unit	Potential Projects
Rolling Mills	▪ Fuel oil substitution ▪ Slab hot charging (1,5x10^{11} Kcal/y) ▪ Waste Heat Recovery
DR	▪ Boiler fuel substitution
EAF	▪ Scrap pre-heating ▪ Oxygen lancing (9x10^{7} Kwh/y) ▪ Dedusting Optimation EAF 5&6 (1,5x10^{7} Kwh/y)
Power Plant	▪ Fuel oil substitution ▪ Waste heat Recovery

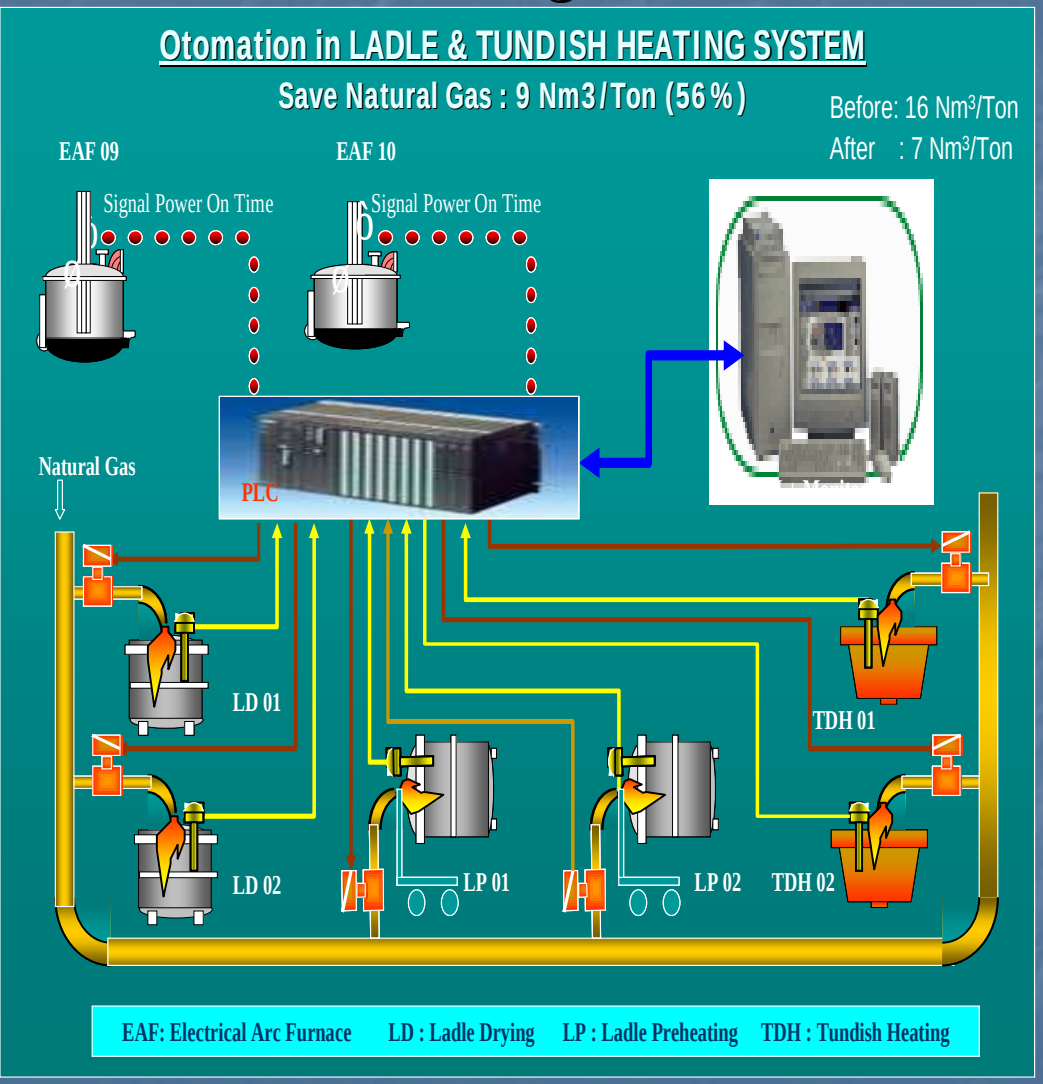
Countermeasures

- Energy efficiency and conservation programs
- Energy diversification / substitution
- Sufficient NG supply security
- Plant improvement and modification
- Cleaner production program

Energy Conservation Activities at PT KS

1. **Examples of Options Successfully Implemented**
   - Burner Control System in Ladle Drying and Preheating
   - Steam Traps & Leaks Survey, Repair and Replacement
   - Neuro Furnace Controller implementation
   - Partial Oxidation
2. **Examples of Options Potentially Implemented**
   - Electricity Saving by Power Reduction of Recirculating Pumps
   - Generate Power from Excess High Pressure Natural Gas through Turbine Expansion & Electrical Generator.
   - Recovering Waste Heat through Billet & Slab Transportation System Modification (Hot Charging)
3. **Examples of Options Others Succesfully & Potentially Implemented**
   - Implementation Network ECC
   - Fuel Oil Substitution

Burners Control System for Ladle Drying and Preheating Process in Slab Steel Plant



2 heat treatment periods of the Ladle & Tundish

1. Preheating
2. Drying

Result:

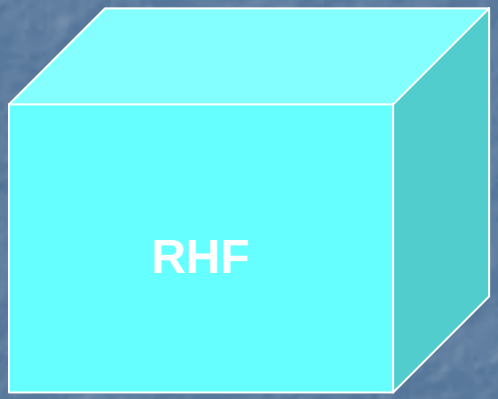
Shorter heating time, reduce fuel consumption significantly from 1244 NM3 / heat to 499 NM3/heat.

Slabs Hot Charging

Basic Concept

- Cold Charging

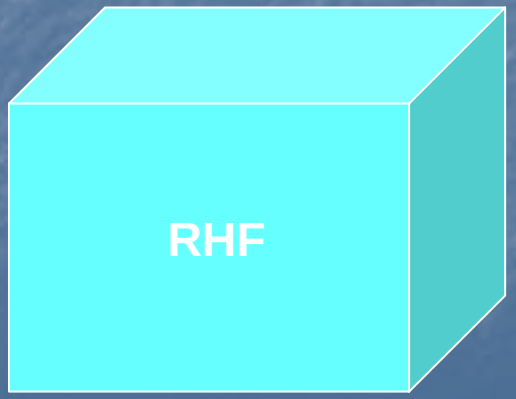
± 30 °C



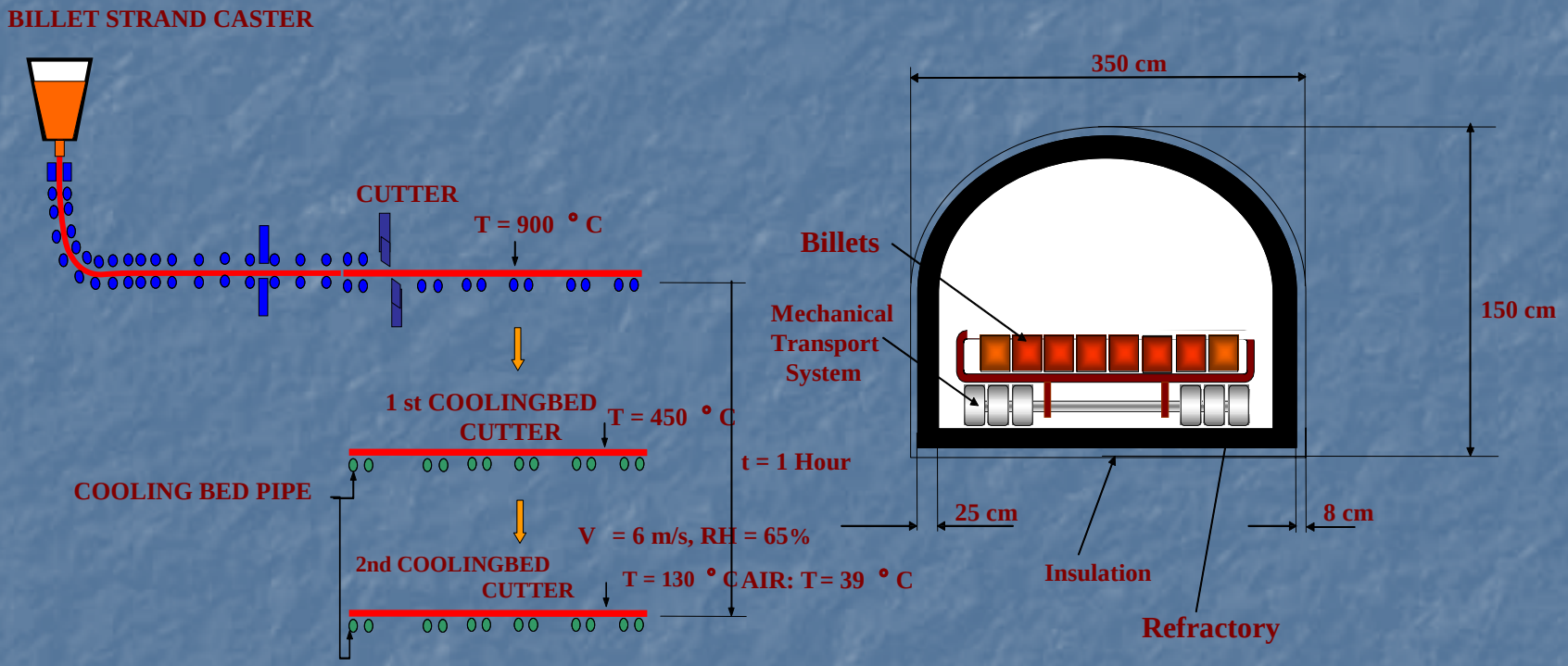
- Hot Charging

Potential Saving:
1.5 x 1011 Kcal/year

± 530 °C

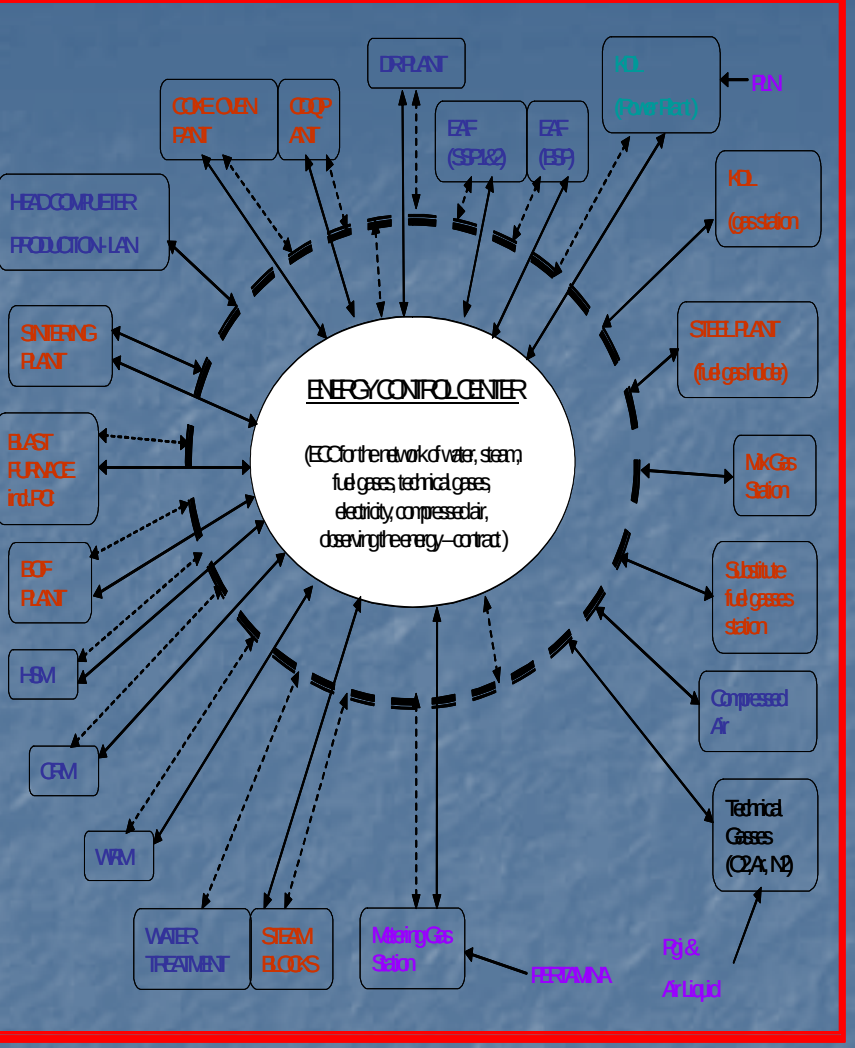


Recovering Waste Heat through Billet Transportation System Modification



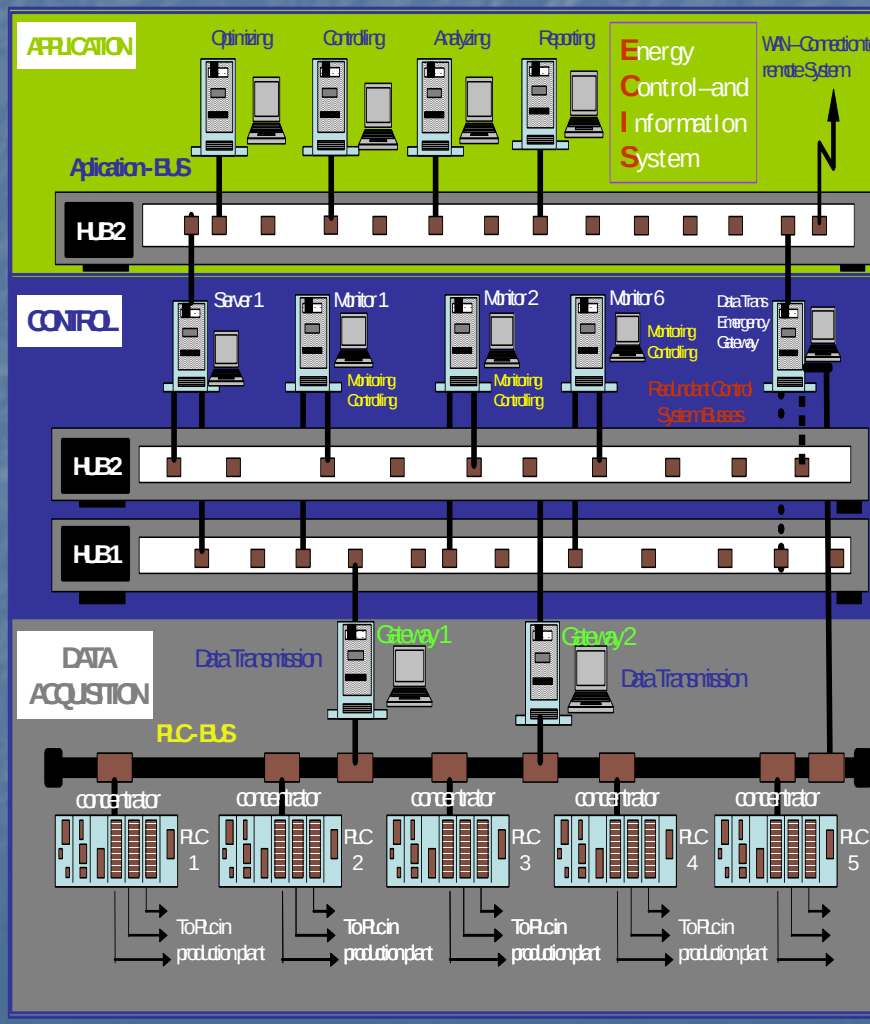
Goal : to minimize heat loss during transferring time from BSP to WRM by performing modification / optimation on Billet Transportation System

Design of Energy Control Centre Network



ECC COMUNICATION SYSTEM

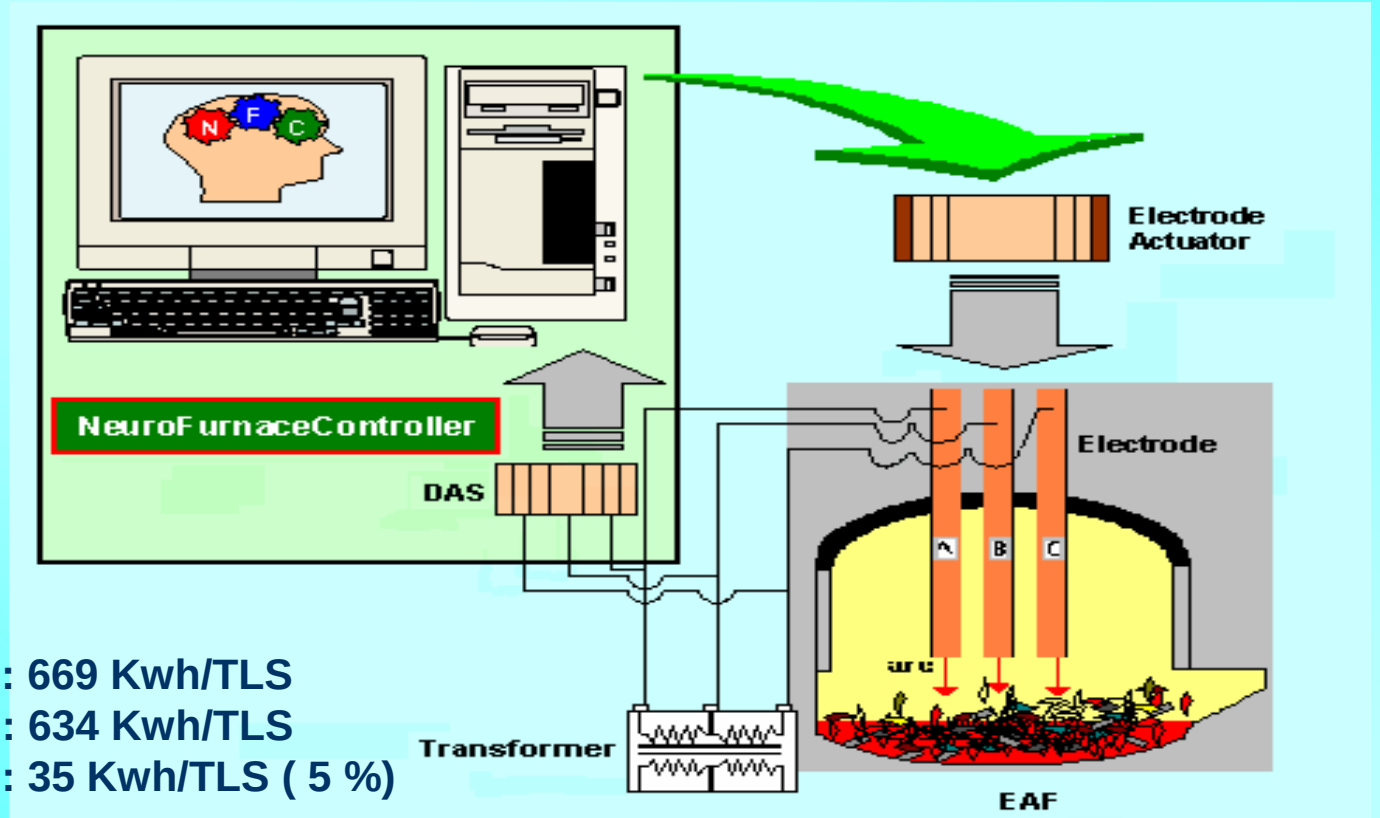
ECC CONFIGURATION



PT KRAKATAU STEEL
Cilegon-Indonesia www.ks.co.id

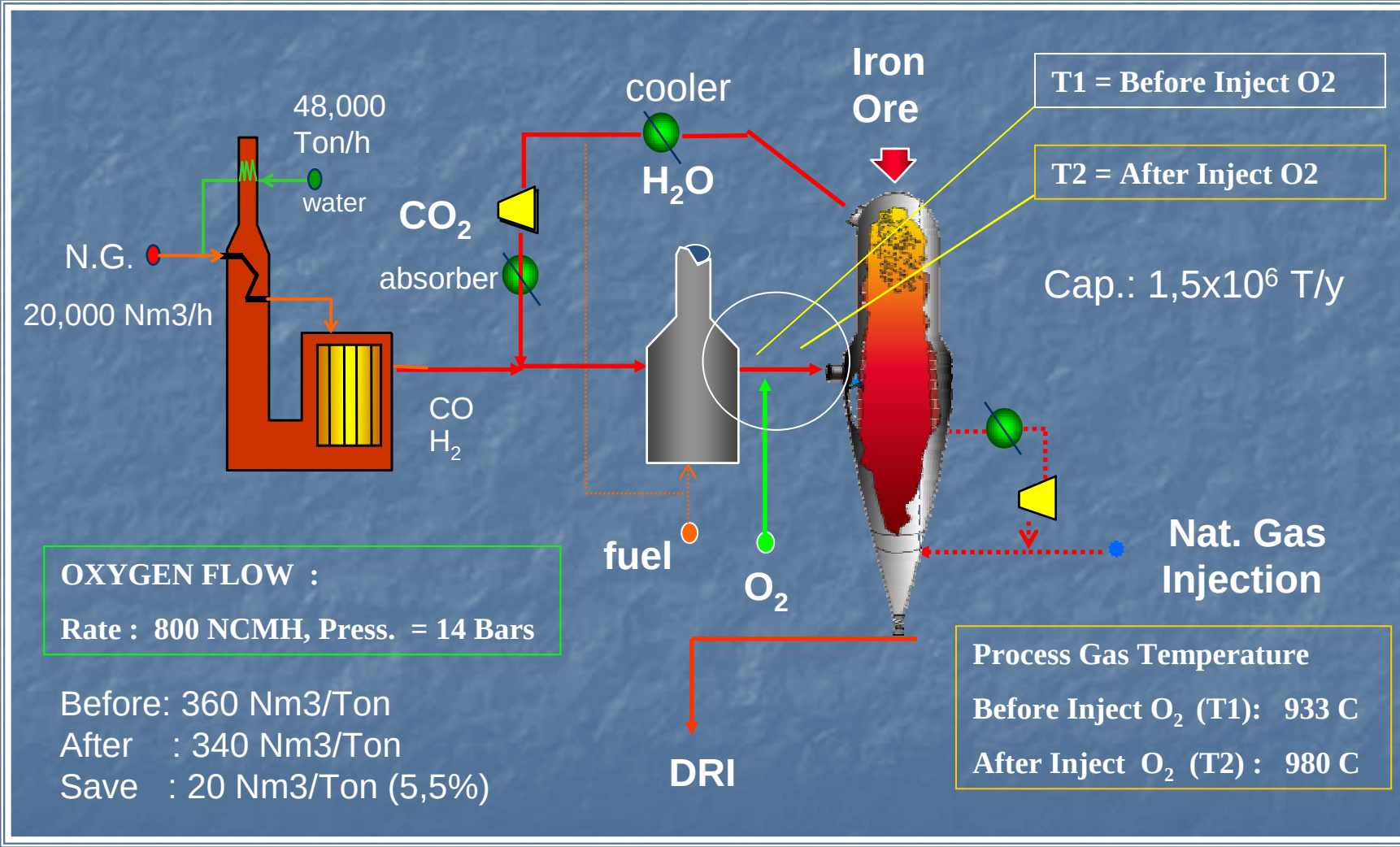
Neuro Furnace Controller

(Reduce Electricity Consumption at the Steel Making Plant)



Before : 669 Kwh/TLS
After : 634 Kwh/TLS
Save : 35 Kwh/TLS (5 %)

HyL-3 Partial Oxidation Process (Save Natural Gas)



OXYGEN FLOW :

Rate : 800 NCMH, Press. = 14 Bars

Before: 360 Nm3/Ton
After : 340 Nm3/Ton
Save : 20 Nm3/Ton (5,5%)

Process Gas Temperature

Before Inject O_2 (T1): 933 C

After Inject O_2 (T2) : 980 C

Total Energy Saving

- Natural Gas (saving from: Partial Oxidation, Steam leaks reparation and Ladle & Tundish Heating Automation):

  = 60 x 10^6 Nm^3 /y = US$ 5,610,326 / y

- Electricity (saving from: Neuro Furnace Controller and others):

  = 80 x 10^6 Kwh /y = US$ 3,804,347 / y

- Total Saving = US$ 9,414,674 / y

PARTNERSHIP PROGRAM ON EE&C FOR INDUSTRY AND COMMERCIAL BUILDING

- Partnership program is the government program on energy conservation focused on energy efficiency improvement for energy intensive industries and commercial buildings
- Government support e.g. Energy Audit (Free of Charge); Training; Technical Assistance and Seminar/ Workshop
- Parties involved in the program which started in 2003 are Government, State-owned Electricity Company, Financial Agency, Industry and Commercial Building

PARTNERSHIP PROGRAM ON EE&C FOR INDUSTRY AND COMMERCIAL BUILDING

- In 3 years committed industries and buildings report to government every 6 (six) month about the progress implementation of the energy audit recommendation.
- In this year, there are 32 industries and building participate in partnership program
- Energy Audit in industries and buildings will be expanded to almost 250 objects (industries and buildings) next year under government budget.

ENERGY AUDIT RESULT - INDUSTRY

INDUSTRY	ENERGY SAVING POTENTIAL	
	(%)	US$/Year
IRON AND STEEL		
Ispatindo, East Java	6.76	2,080,441
Roda Mas Baja Inti, South Sulawesi	10.75	11,280
Barawaja, South Sulawesi	20.6	9,745
TEXTILE		
Roda Vivatex – West Java	2.6	272,554
Bhineka Karya Manunggal 1 - West Java	15.74	64,385
Bhineka Karya Manunggal 2 - West Java	3.99	493,250
Vastex Prima - West Java	7.58	69,200
Indah Jaya Textile – Banten	13.74	77,921
FLOUR MILLS		
Berdikari Sari Utama, West Java	22.2	195,179

ENERGY AUDIT RESULT - BUILDING

BUILDING	ENERGY SAVING POTENTIAL	
	(%)	US$/Year
COMMERCIAL BUILDING		
Graha Pangeran, East Java	9.83	18,386
Sarana Jaya, Jakarta	10.10	43,400
Dharma Niaga, Jakarta	10.86	14,109
Bimantara, Jakarta	11.09	49,225
Plaza Permata, Jakarta	15.08	33,386
Ina Bali Beach Hotel, Bali	10.74	113,692
Fantasi Mall, East Kalimantan	19	30,967
GOVERNMENT OFFICE		
Bank of Indonesia, South Sumatera	1.92	34,875
R&D Oil and Gas, Jakarta	0.7	848
Training Center MEMR, Jakarta	9.71	5,041
DGEEU, Jakarta	24	13,120

OVERSEAS COOPERATION ON EE&C

I. GREENHOUSE GAS EMISSION REDUCTION from INDUSTRIES in ASIA and PACIFIC (GERIAP) – UNEP

- Enhancing energy efficiency improvement for mitigating GHG emission
- Energy Audit for intensive energy industry :
  - Cement
  - Fertilizer
  - Pulp & Paper
  - Iron & Steel

II. PROMOTION on ENERGY EFFICIENCY and CONSERVATION (PROMEEC), ASEAN – ECCJ/METI JAPAN

- Promoting energy saving implementation for industry and building in ASEAN region
- Energy Audit/Energy Management, Database, Benchmarking for industry and building :
  - Industry (2005) : Pulp & Paper Mills, Spinning
  - Commercial building (2004) : Hotel - 2 (two) five star class

Conclusion

- The energy conservation efforts have reduced energy consumption rate and production cost and at the same time contribute to create better environmental condition.
- Supported by the management and all employee, these efforts have been implemented succesfully and continuously.