

Overview of Steel Industry in Thailand

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สถาบันเหล็กและเหล็กกล้าแห่งประเทศไทย
IRON AND STEEL INSTITUTE OF THAILAND

- **Thailand steel situation**

- **Specific Energy Consumption (SEC) in 1999 - 2004**

Integrated steel production process

Ironmaking

Iron ore + Coke
or
Iron ore + Natural gas

Hot metal

Pig iron
Sponge iron

Steelmaking & casting

Scrap

Basic oxygen Furnace

Electric Arc Furnace

Steel forming

Billet
Bloom

Slab

Heavy Section

Hot rolled coil

Hot rolled plate

Round bar, Deformed bar

Cold rolled coil

Wire rod

HDG

EG

Tin plate, tin free

Light section

Pipe

HDG
Pipe

Cold
formed
section

Downstream industry

Construction

Auto parts

Appliance

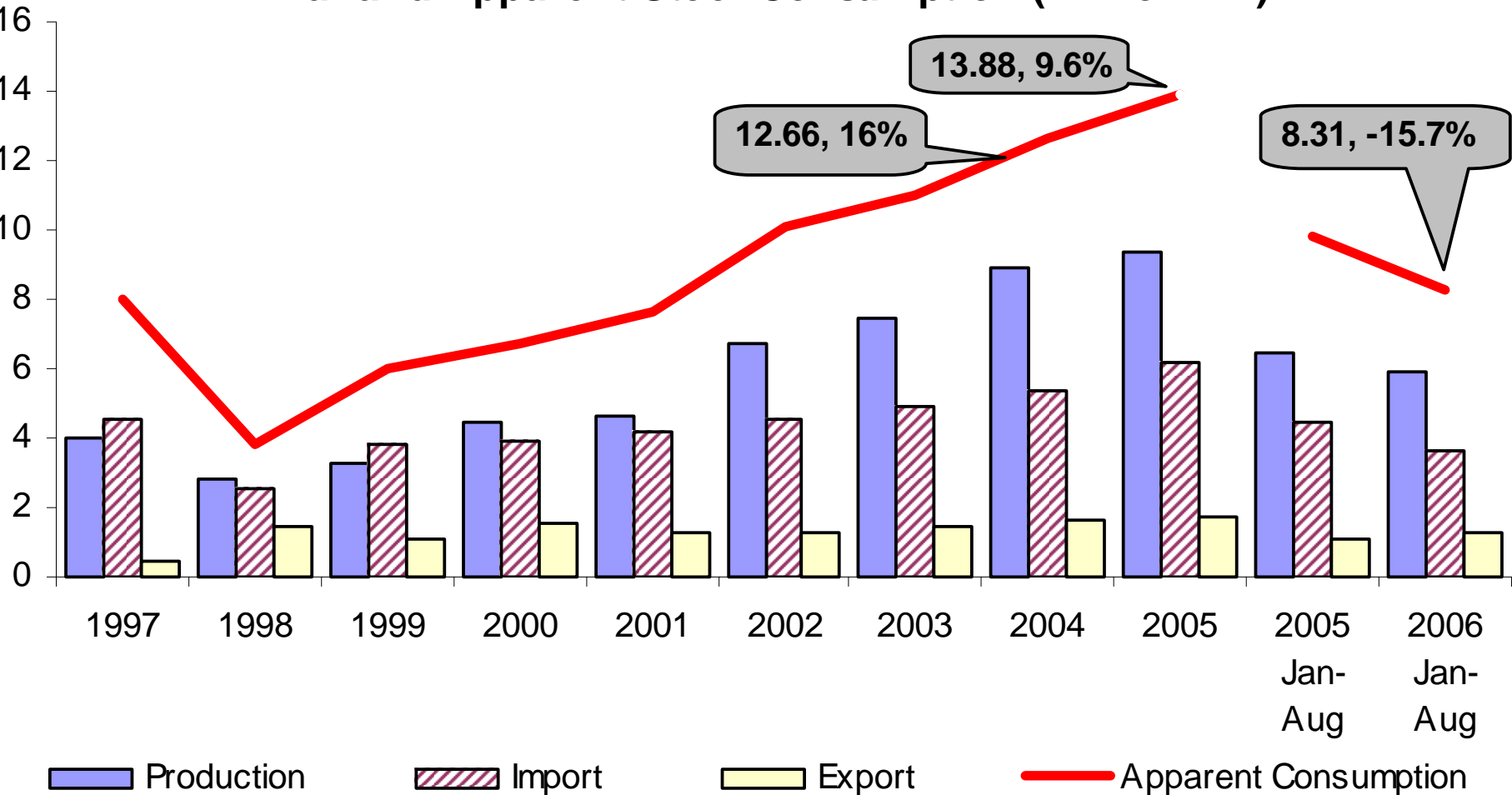
Furniture

Packaging

2

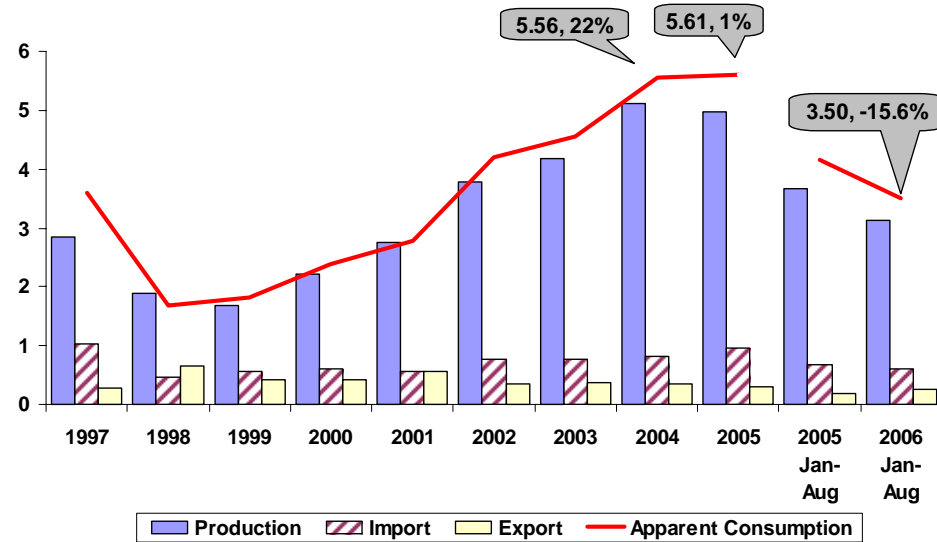
The decline since second half of 2005 was mainly derived from a slowdown in consumer expenditure and investment.

Thailand Apparent Steel Consumption (million MT)



Long Products

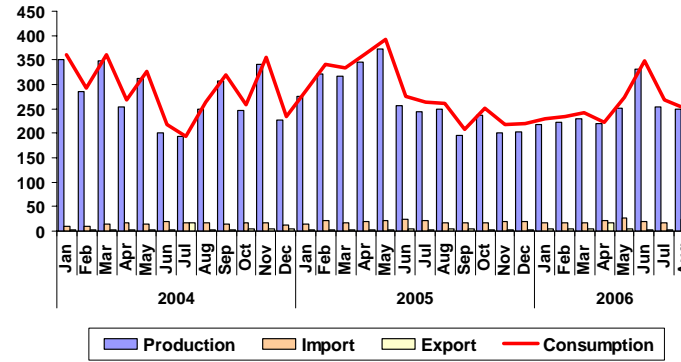
Thailand Long Product Apparent Consumption (million MT)



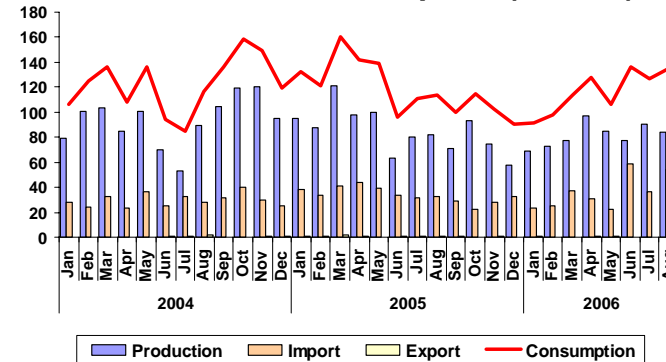
Unit : 000 MT

| Long Product | 2005 Jan-Aug | 2006 Jan-Aug | %Change |
|----------------------|--------------|--------------|---------|
| Production | 3,664 | 3,134 | -14.5% |
| Import | 674 | 618 | -8.4% |
| Export | 194 | 252 | 30.3% |
| Apparent Consumption | 4,145 | 3,500 | -15.6% |

Bar Consumption (000 MT)



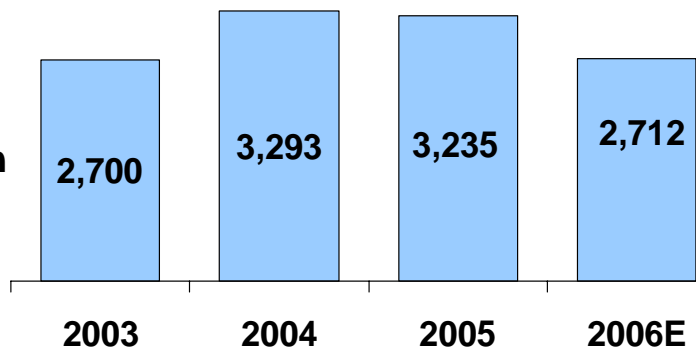
Wire rod Consumption (000 MT)



Bar production

Unit : 000 MT

Production

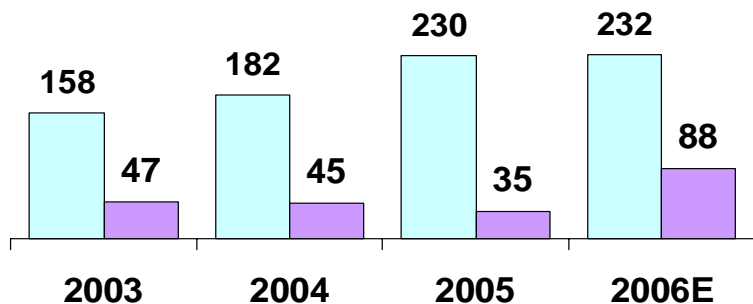


Producers

- Millineum Steel
- Bangkok Steel Industry
- Burapa Steel Industries
- Other
- Bangsaphan Bar mi
- Chonviriya Steel
- Thai Steel Profile

Bar import - export

■ Import
■ Export



Major sources (import)

- S.Korea
- Taiwan
- Japan
- China

Main destination (export)

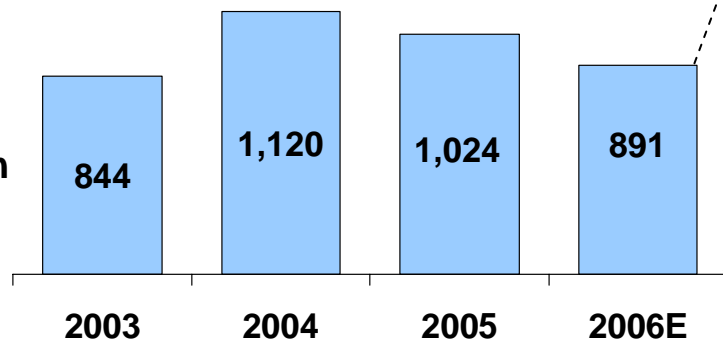
- USA
- Cambodia
- Lao Republic
- Australia

Wire rod

Wire rod supply

Unit : 000 MT

Production

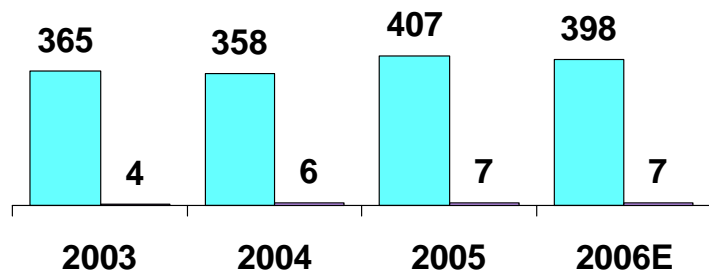


Producers

- Siam Iron and Steel (2001)
- Bangkok Industrial Steel Work
- Tycoons Worldwide
- Thai Special Steel Industry
- Other

Wire rod import - export

■ Import
■ Export



Major sources (import)

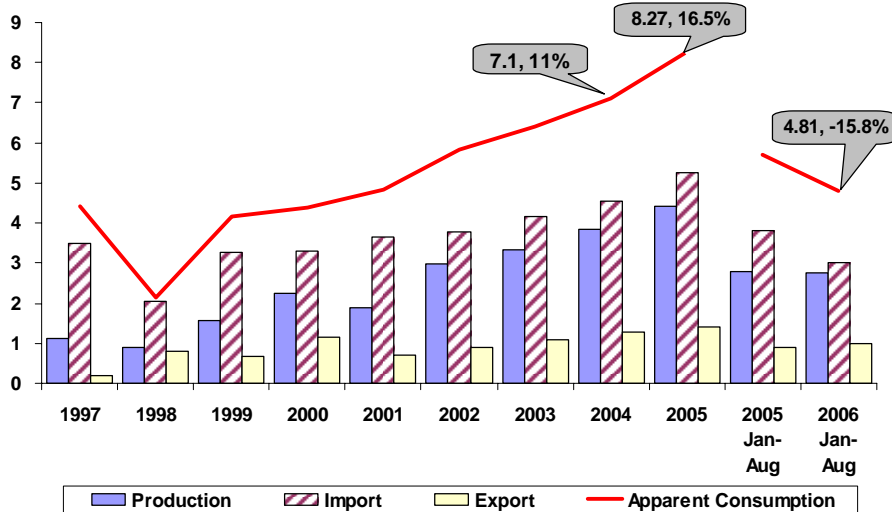
- China
- Taiwan
- Japan
- India

Main destination (export)

- Vietnam
- Cambodia
- Lao Republic
- India

Flat Products

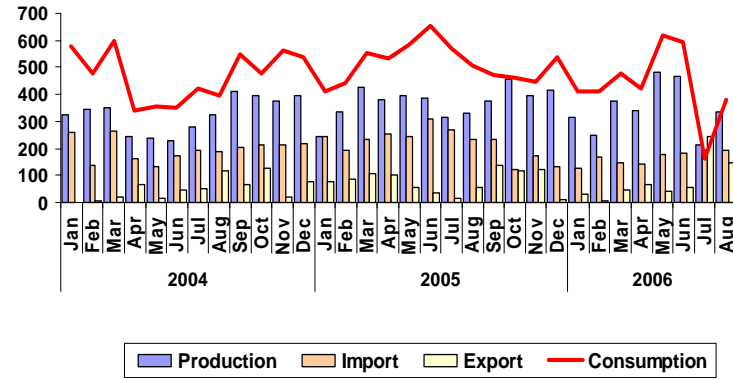
Thailand Flat Product Apparent Consumption (million MT)



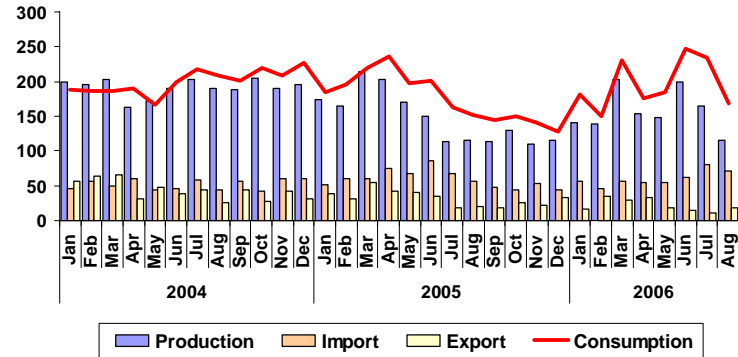
Unit : 000 MT

| Flat Product | 2005 Jan-Aug | 2006 Jan-Aug | %Change |
|----------------------|--------------|--------------|---------|
| Production | 2,788 | 2,767 | -0.7% |
| Import | 3,807 | 3,020 | -20.7% |
| Export | 889 | 982 | 10.5% |
| Apparent Consumption | 5,706 | 4,805 | -15.8% |

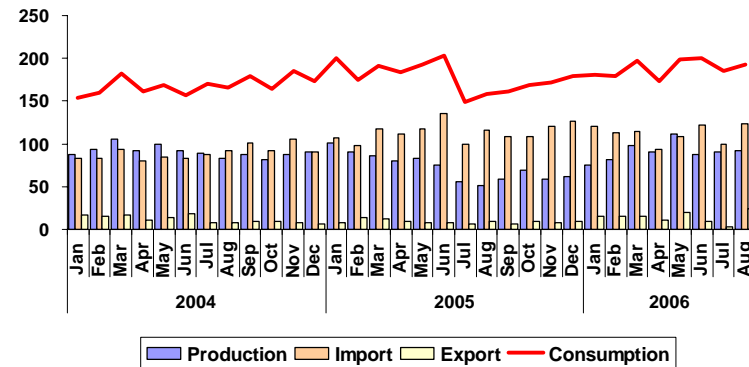
HR Consumption (000 MT)



CR&CR Stainless Consumption (000 MT)



Coated Consumption (000 MT)

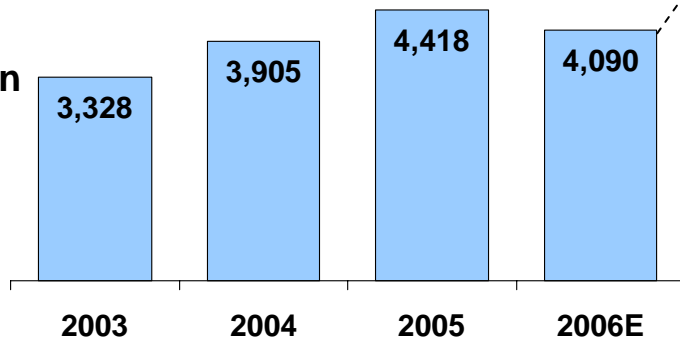


Hot Rolled Products

HR supply

Unit : 000 MT

Production

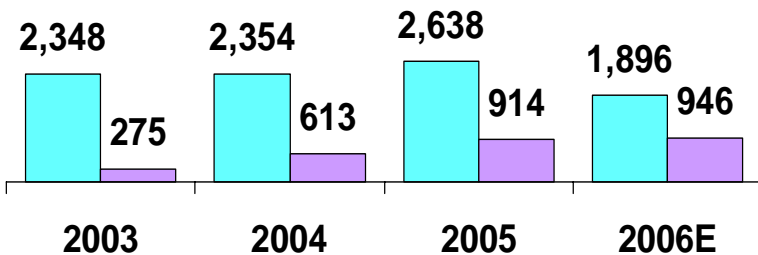


Producers

- Sahaviriya Steel Industry
- G Steel
- NSM
- Sahaviriya Plate Mill
- LPN

HR Import - export

■ Import
■ Export



Major sources (import)

- Japan
- China
- S.Korea
- Taiwan

Main destination (export)

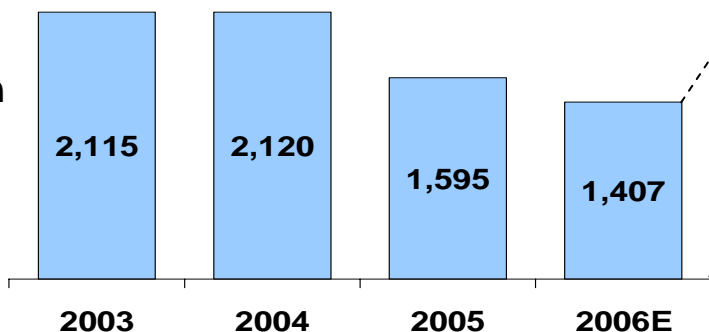
- USA
- Europe
- Vietnam
- Indonesia

Cold Rolled Products

CR supply

Unit : 000 MT

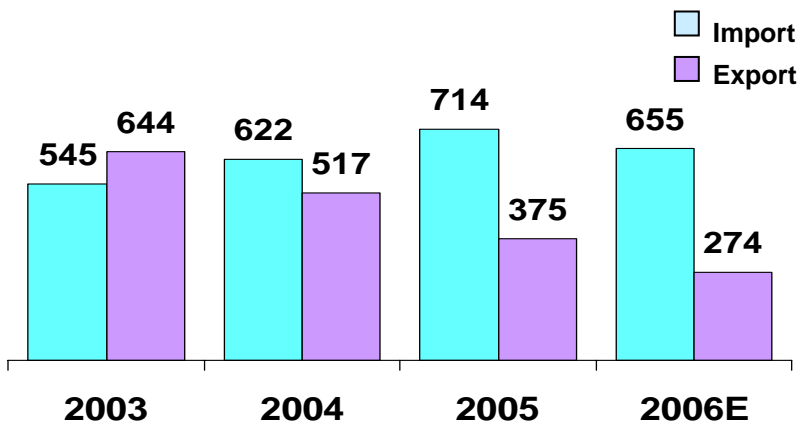
Production



Producers

- TCRSS
- Siam United Steel
- Bluescope Steel (Thailand)
- Thainox Stainless

CR Import - export



Major sources (import)

- Japan
- China
- S.Korea
- Taiwan

Main destination (export)

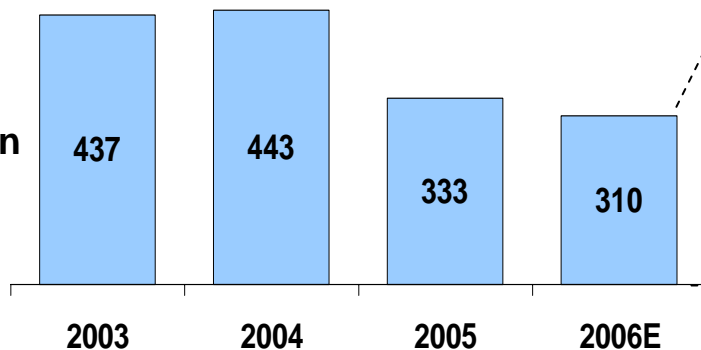
- Malaysia
- Vietnam
- China
- Hong Kong

Coated Products - GI

GI supply

Unit : 000 MT

Production

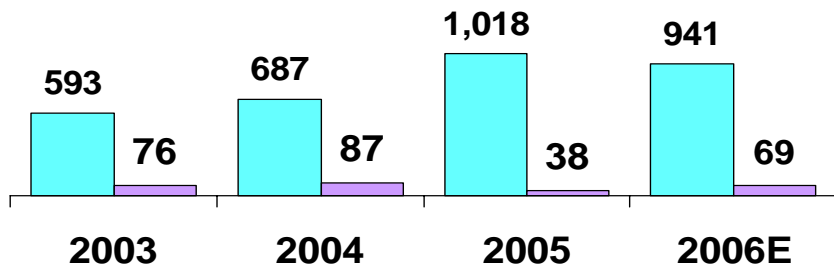


Producers

- Bangkok Steel Industry
- Thai Coated Steel
- Sangasri Thai
- Thailand Iron Work
- Ratchasima Steel

GI Import - export

■ Import
■ Export



Major sources (import)

- Japan
- China
- S.Korea
- Taiwan

Main destination (export)

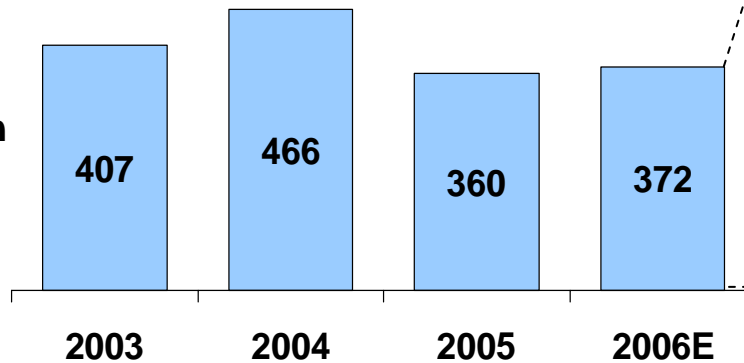
- Myanmar
- USA
- Malaysia
- Lao Republic

Coated Products – TP&TF

TP&TF supply

Unit : 000 MT

Production

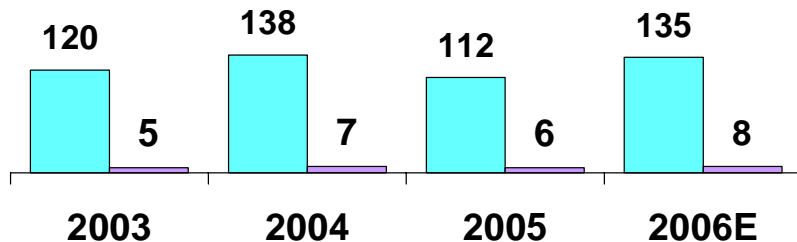


Producers

- Siam tinplate
- Thai tinplate

TP&TF Import - export

■ Import
■ Export



Major sources (import)

- S.Korea
- Taiwan
- Japan
- China

Main destination (export)

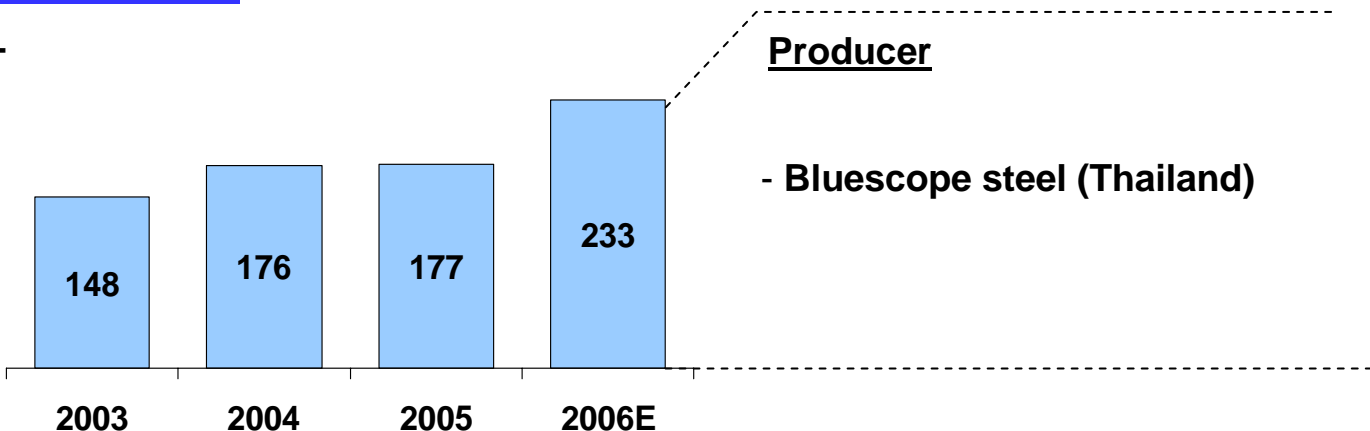
- Lao Republic
- Indonesia
- Cambodia
- Vietnam

Coated Products – Other coated (Zn-Al, color, other metallic coated)

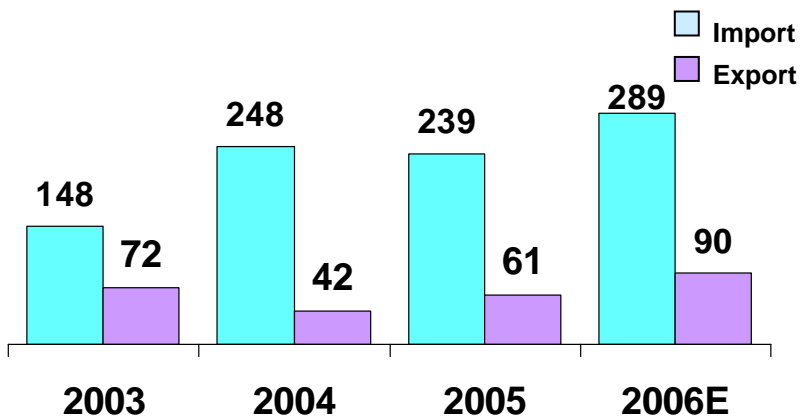
Other coated supply

Unit : 000 MT

Production



Other coated import - export



Major sources (import)

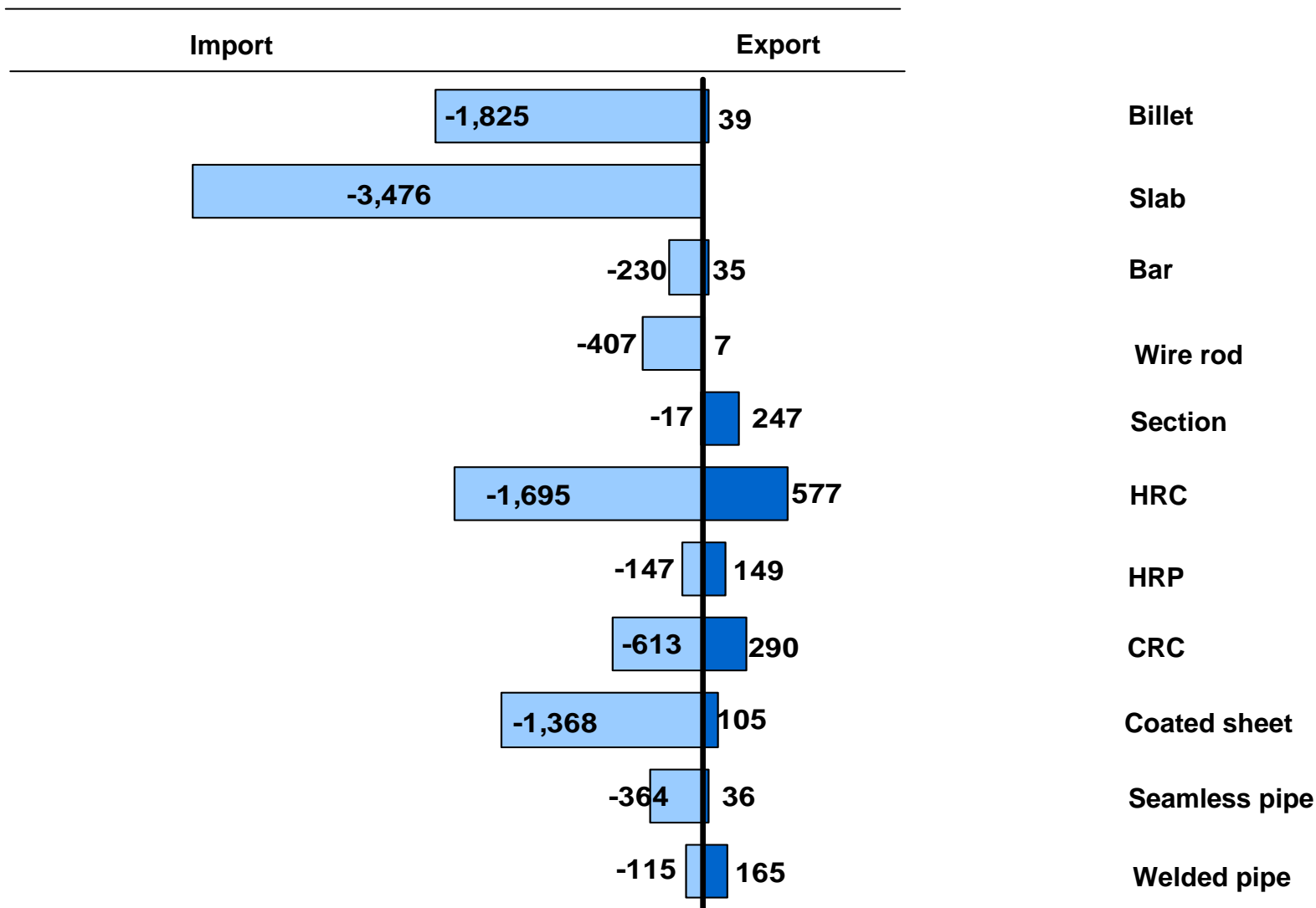
- Japan
- China
- S.Korea
- Taiwan

Main destination (export)

- Lao Republic
- Indonesia
- Cambodia
- Vietnam

Thailand still relies on imports of both semi-finished and finished steel products, specially for flat steel product group.

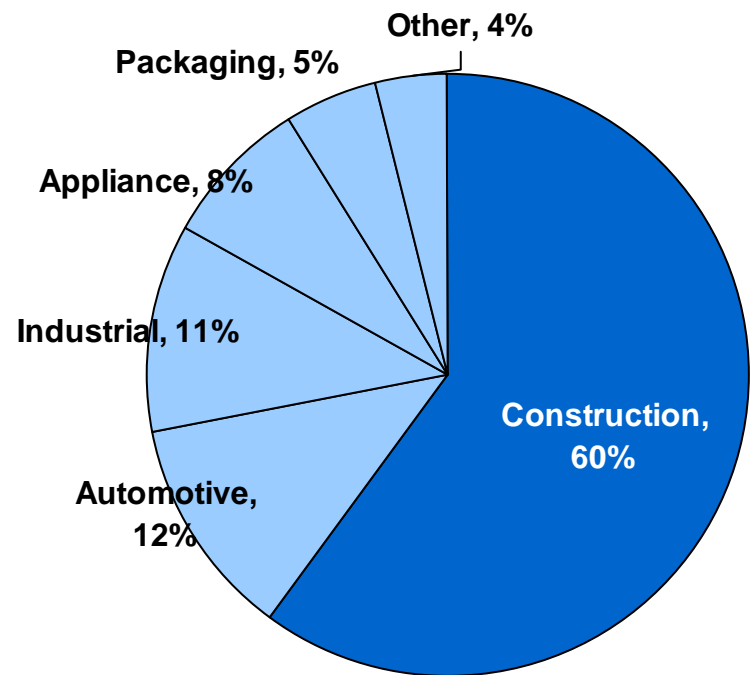
Thailand steel Import – Export in 2005 (Unit : '000 tonnes)



Construction is a major consuming sector, most of its application requires commercial steel grade.

- Total consumption in 2005 = 13.88 million tonnes
- Consumption per capita in 2005 = 212 kg
- Ratio of long : flat steel consumption = 40 : 60
- Consumption by downstream sector

| | |
|----------------|-----|
| - Construction | 60% |
| - Automotive | 12% |
| - Industrial | 11% |
| - Appliance | 8% |
| - Packaging | 5% |
| - Other | 4% |



- **Thailand steel situation**

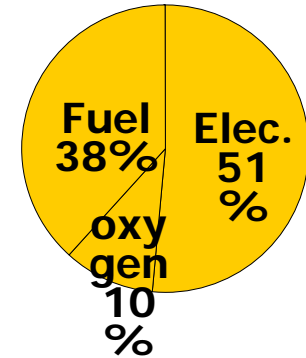
- **Specific Energy Consumption
(SEC) in 1999 - 2004**

Specific Energy Consumption for bar products

BAR with EAF
Raw material :
Scrap

Average
SEC
(MJ/ton
5,09
5

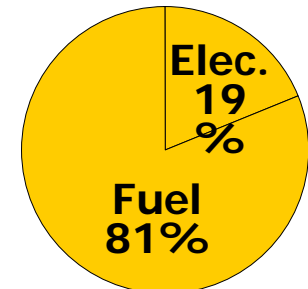
Ratio (%)



BAR without EAF
Raw material :
Billet

Average
SEC
(MJ/ton
2,07
5

Ratio (%)

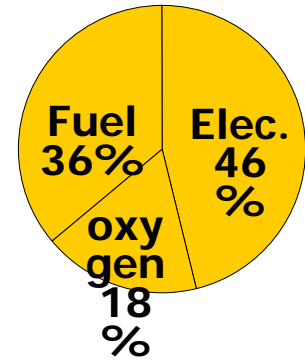


Specific Energy Consumption for wire rod products

Wire rod with EAF
Raw material :
Scrap

Average
SEC
(MJ/ton
6,44
2

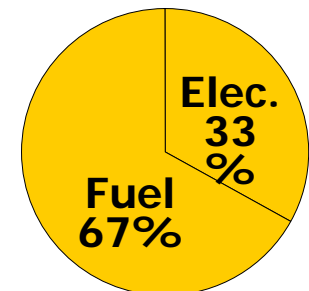
Ratio (%)



Wire rod without
EAF
Raw material :

Average
SEC
(MJ/ton
3,21
2

Ratio (%)

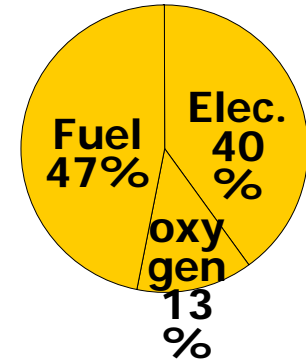


Specific Energy Consumption for hot rolled section products

Hot rolled section
with EAF
Raw material :

Average
SEC
(MJ/ton
6,05
1

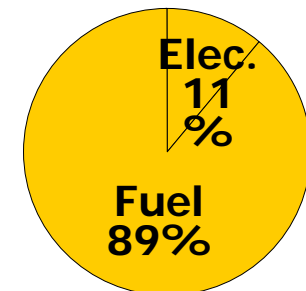
Ratio (%)



Hot rolled section
without EAF
Raw material :

Average
SEC
(MJ/ton
)
2,88
6

Ratio (%)



Specific Energy Consumption for hot rolled sheet

products

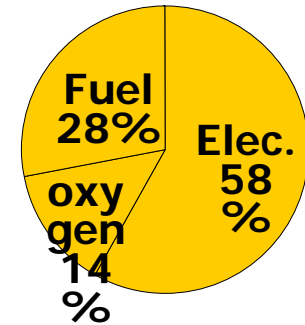
HR with EAF

Raw material :

Scrap

Average
SEC
(MJ/ton
4,71
0

Ratio (%)



HR without EAF

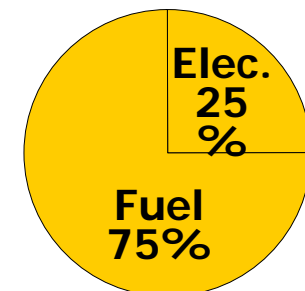
Raw material : Slab

Product : Hot rolled

coil / Hot rolled

Average
SEC
(MJ/ton
)
2,24
6

Ratio (%)

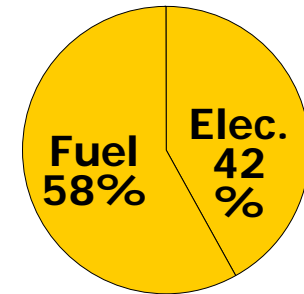


Specific Energy Consumption for cold rolled sheet products

CRC
Raw material : Hot rolled coil

Average
SEC
(MJ/ton)
1,787

Ratio (%)

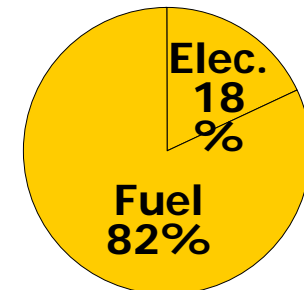


Specific Energy Consumption for hot dip galvanized sheet products

HDG
Raw material : Cold rolled coil

Average
SEC
(MJ/ton)
1,439

Ratio (%)

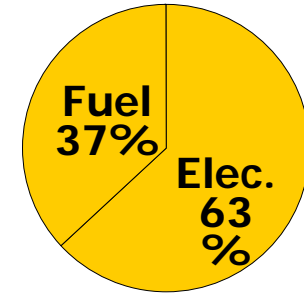


Specific Energy Consumption for electro-galvanized sheet products

EG
Raw material : Cold rolled coil

Average
SEC
(MJ/ton)
1,300

Ratio (%)

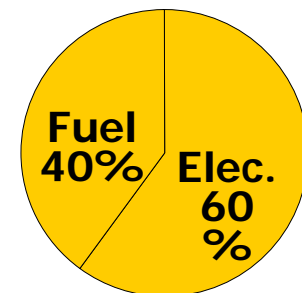


Specific Energy Consumption for tin-plate & tin-free sheet products

TP&TF
Raw material : Cold rolled coil - TMBP

Average
SEC
(MJ/ton)
876

Ratio (%)

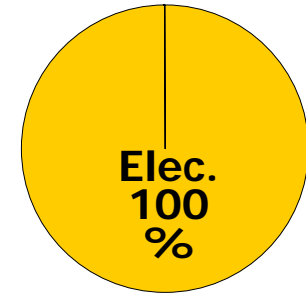


Specific Energy Consumption for cold-formed section products

Cold formed section
Raw material : Hot
rolled coil

Average
SEC
(MJ/ton
)
21

Ratio (%)

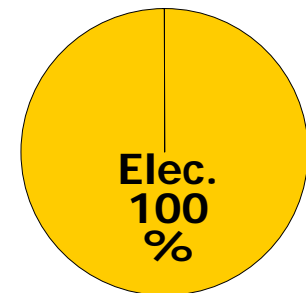


Specific Energy Consumption for ERW pipe products

ERW pipe
Raw material : HRC,
CRC

Average
SEC
(MJ/ton
)
235

Ratio (%)

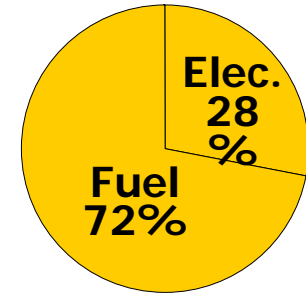


Specific Energy Consumption for galvanized steel pipe products

HDG pipe
Raw material : Hot
rolled coil

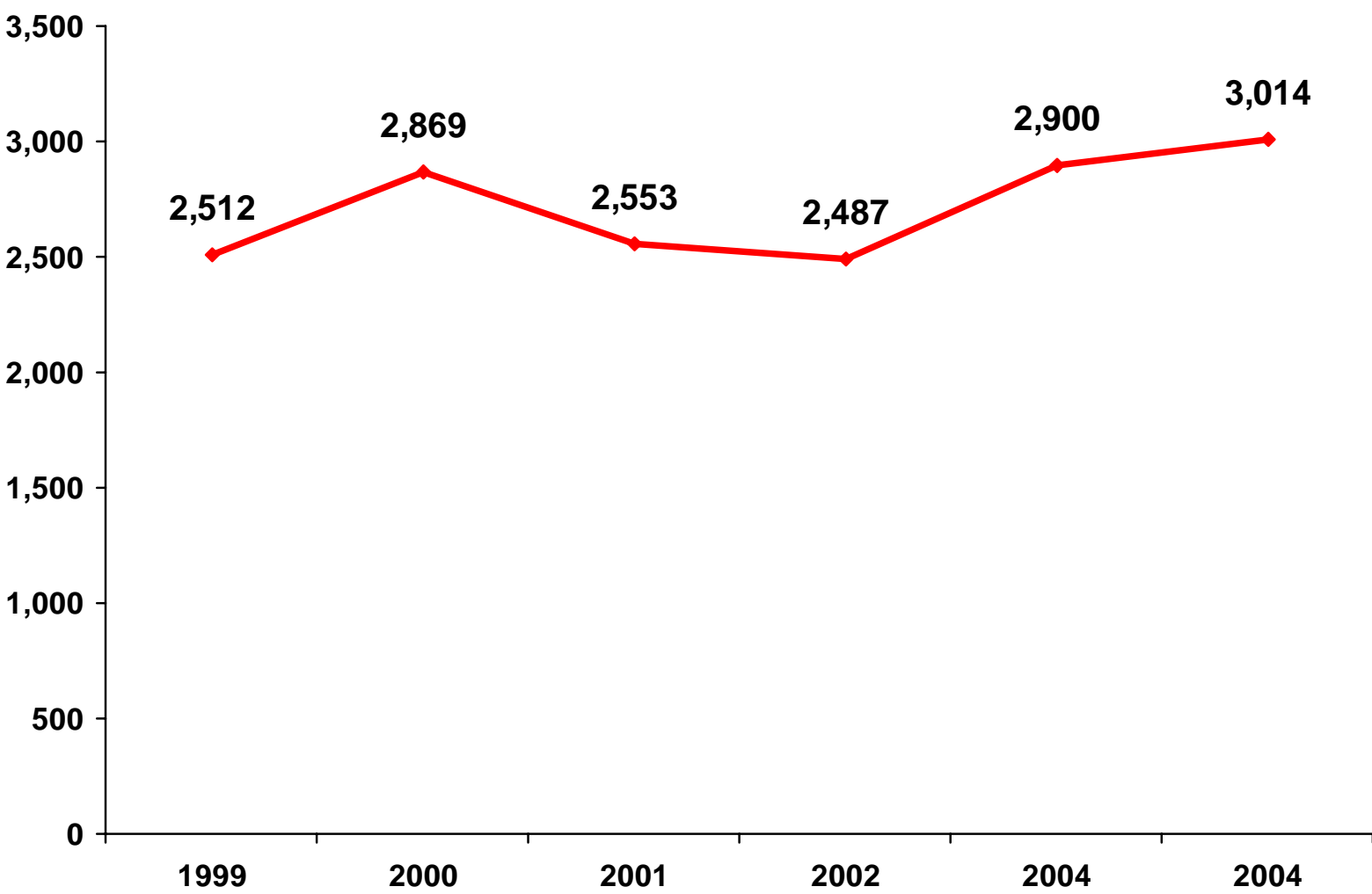
Average
SEC
(MJ/ton
)
1,67
0

Ratio (%)



Thailand specific energy consumption in 1999 - 2004

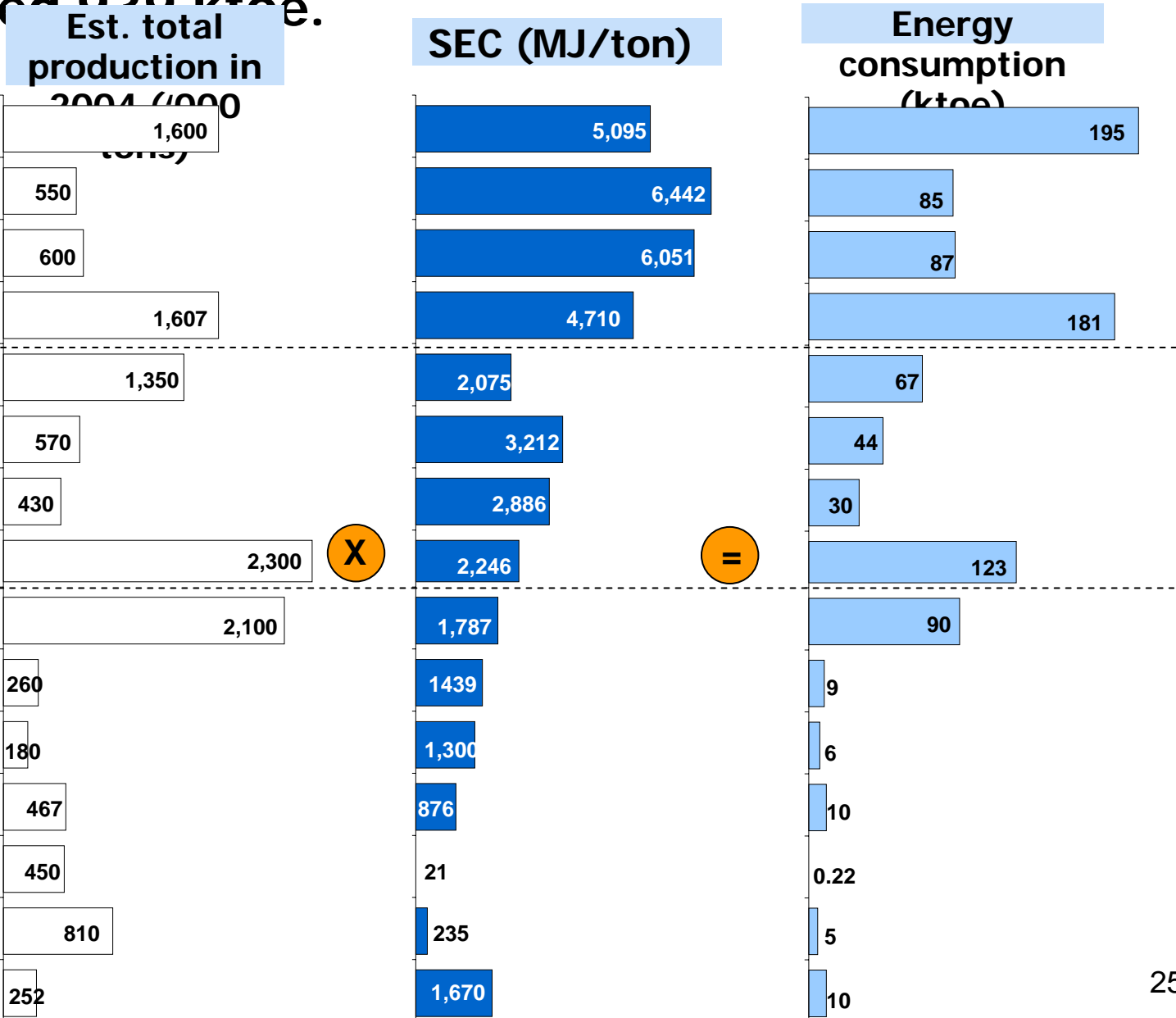
MJ/ton



Total energy equivalent demand for Thai steel industry is estimated 220 ktoe.

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II



Energy consumption for Thai steel industry

| Steel sectors | Est. total production in 2004 ('000 tons) | Energy consumption (ktoe) | Production ratio (%) | Energy consumption ratio (%) |
|----------------------------------|---|---------------------------|----------------------|------------------------------|
| 1 Bar_EAF | 1,600 | 195 | 12% | 21% |
| 2 Bar_no EAF | 1,350 | 67 | 10% | 7% |
| 3 Wire rod_EAF | 550 | 85 | 4% | 9% |
| 4 Wire rod_no EAF | 570 | 44 | 4% | 5% |
| 5 Hot rolled section_EAF | 600 | 87 | 4% | 9% |
| 6 Hot rolled section_no EAF | 430 | 30 | 3% | 3% |
| 7 HR_EAF | 1,607 | 181 | 12% | 19% |
| 8 HR_no EAF | 2,300 | 123 | 17% | 13% |
| 9 Cold rolled steel sheet | 2,100 | 90 | 16% | 10% |
| 10 Hot dip galvanized | 260 | 9 | 2% | 1% |
| 11 Electro-galvanized | 180 | 6 | 1% | 1% |
| 12 Tin plate & tin free steel | 467 | 10 | 3% | 1% |
| 13 Cold formed section | 450 | 0.22 | 3% | 0.02% |
| 14 ERW pipe | 810 | 5 | 6% | 0.48% |
| 15 Hot dip galvanized steel pipe | 252 | 10 | 2% | 1% |
| Total | 13,526 | 939 | 100% | 100% |

Conversion factor

| | Unit | MJ |
|--|-------|---------------|
| ▪ Electricity | kWh | 3.6 |
| ▪ Oxygen (EAF)* (kWh/NM3) x 3.6 (MJ/kWh)] | NM3 | 18.72 [= 5.2] |
| ▪ Natural gas | MMBTU | 1,055.87 |
| ▪ LPG | kg | 50.23 |
| ▪ Bunker oil | litre | 39.77 |
| ▪ Diesel | litre | 36.42 |
| ▪ Kerosene | litre | 34.53 |

Remark: In steelmaking process, oxygen is one source of energy to melt steel scrap. Chemical reaction between oxygen and carbon evolves heat as exothermic reaction.