

# HBI and the Merchant Metallics Market

Presented by  
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**Direct Reduced Iron (DRI):** a highly porous, metallic material in the form of pellets, lumps, and cold-molded briquettes produced by the reduction (removal of oxygen) of iron oxides below the fusion point of iron having metallic iron content greater than 75 percent, average particle size of 6.35-25 mm, and apparent density less than 5,000 kg/m<sup>3</sup>

*Classified by IMO as DRI (B) Lumps, pellets. cold-moulded briquettes*

**Hot Briquetted Iron (HBI):** a dense, metallic material formed by the compaction of DRI at a temperature greater than 650° C having metallic iron content greater than 75 percent, apparent density greater than 5,000 kg/m<sup>3</sup>, length of 50-140 mm, width of 40-100 mm, thickness of 20-50 mm, weight of 0.2-3.0 kg, and particle size greater than 25 mm

*Classified by IMO as DRI (A) Briquettes, hot-moulded*



**Partial Briquettes:** result of breakage during processing, handling, and screening. Particle size typically ranges from 12-25 mm

*Considered by IMO as DRI (A). or HBI, for shipping purposes*

**DRI/HBI Fines:** a porous, metallic material generated as a byproduct of the manufacturing and handling of DRI and HBI having a metallic iron content up to 75 percent, an apparent density less than 5,000 kg/m<sup>3</sup>, and an average particle size less than 6.35 mm with none greater than 12 mm

*Classified by IMO as DRI (C) By product fines*

**Scrap Substitutes, Alternative Iron Sources, Merchant Metallics:** collective term for HBI, DRI, and merchant pig iron

**Scrap Supplement:** preferred term for HBI

**Weight:** 0.2 to 3.0 kg (0.5-6.6 lbs)

**Apparent Density:** > 5000 kg/m<sup>3</sup> (> 312 lbs/ft<sup>3</sup>)

**Bulk Density:** 2500-3300 kg/m<sup>3</sup> (156-206 lbs/ft<sup>3</sup>)

**Size:**

**Length** = 50-140 mm (1.97-5.5 in)

**Width** = 40-100 mm (1.6-3.9 in)

**Thickness** = 20-50 mm (0.79-1.97 in)



**Typical (%)**

Total Iron (Fe)	90.0 to 94.0
Gangue	1.95 to 5.1
P <sub>2</sub> O <sub>5</sub>	0.02 to 0.11
S	0.003 to 0.03
C	0.8 to 1.7
Residuals	Traces

# HBI Production-Use Flow Scheme



## Created with Safety in Mind

**DRI shipments began in the 1970s**

**Accidents due to self-heating tendency of DRI**

**HBI introduced in 1976 to make DRI safer to handle, transport, and store**

**Effects of briquetting:**

- ✓ **Less porous**
- ✓ **Less surface area exposed for re-oxidation**
- ✓ **Less water pick up (3% vs. 12-15% for DRI)**
- ✓ **Higher thermal conductivity to release heat**

**HBI is safe for carriage as a bulk cargo because of its physical characteristics**

- ✓ From various steel products (sources not always known)
- ✓ Limited collection season
- ✓ Waste product (inclusions)
- ✓ Dissimilar, diverse chemistry
- ✓ Heterogeneous / Steel

- ✓ From natural iron ore (mine to dedicated plant)
- ✓ Year-round manufactured product
- ✓ Original product (low residuals)
- ✓ Known, consistent chemistry
- ✓ Homogeneous / Iron



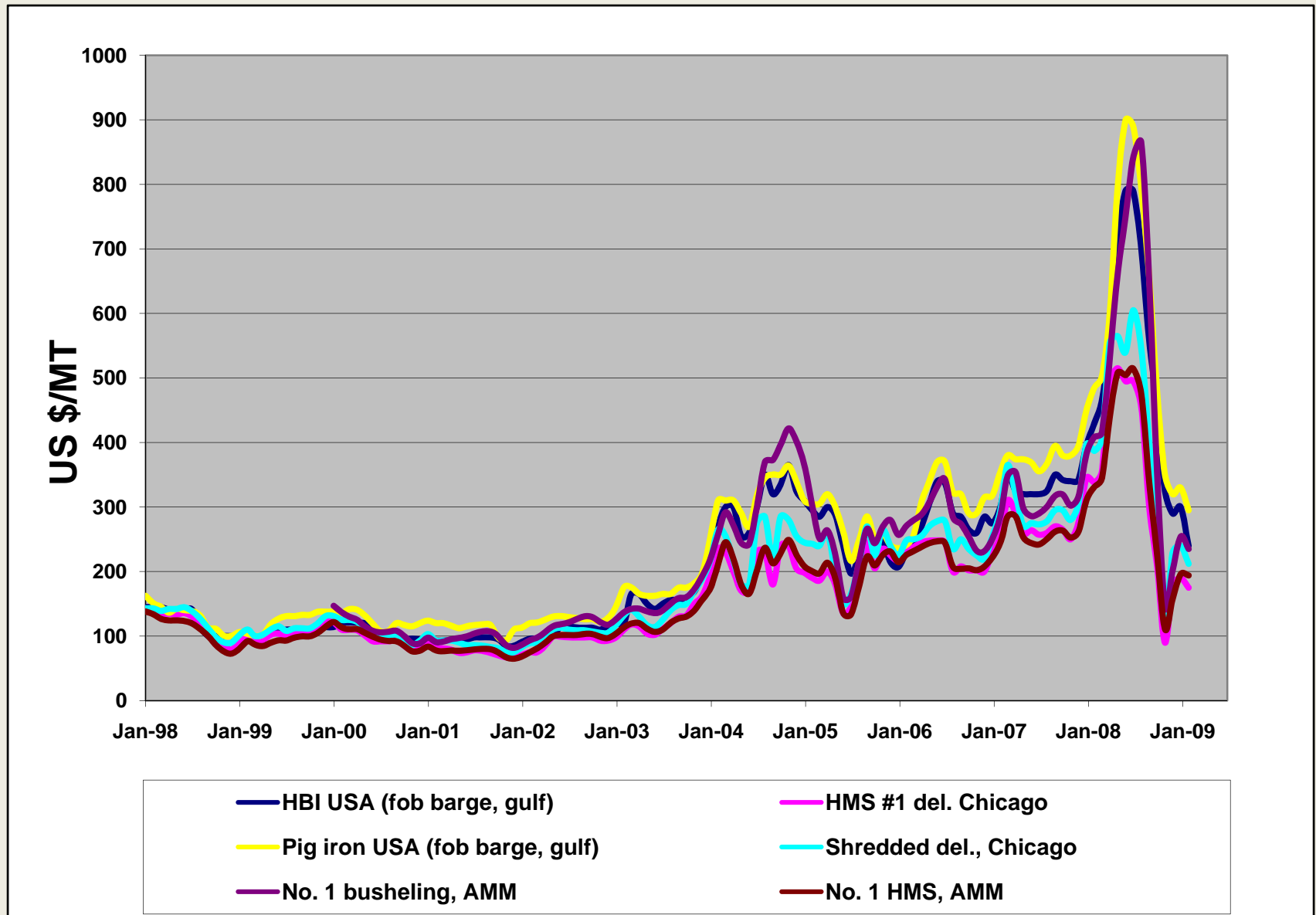
**Scrap**



**HBI**

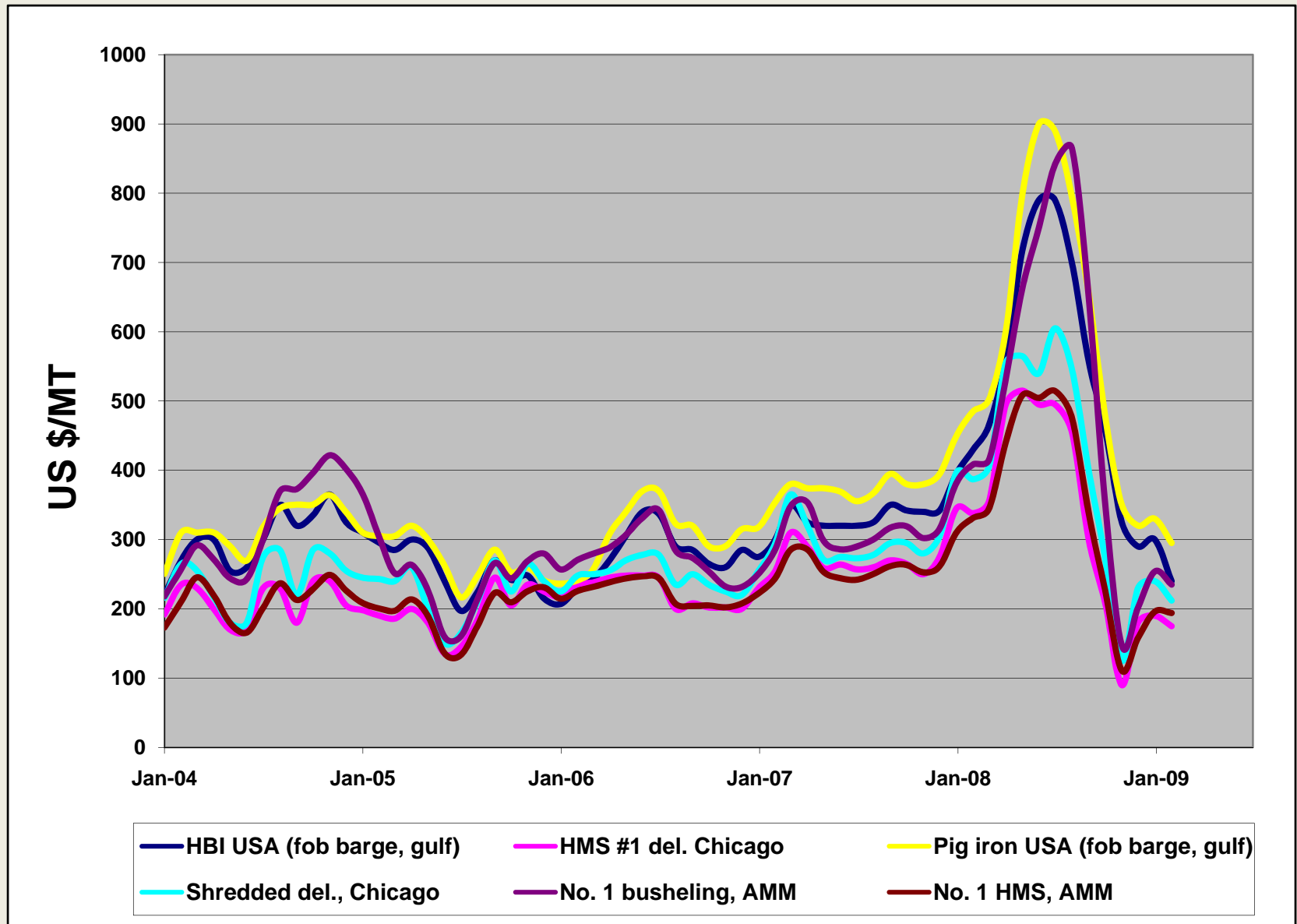
	2000	2005	2010	2015
<b>Metallics Required (000 t)</b>				
<b>Steel Production</b>	<b>847.7</b>	<b>1145.8</b>	<b>1344.2</b>	<b>1558.3</b>
<b>EAF Production</b>	<b>287.4</b>	<b>365.0</b>	<b>430.6</b>	<b>511.7</b>
<b>EAF Metallics</b>	<b>316.1</b>	<b>401.5</b>	<b>473.6</b>	<b>562.9</b>
<b>Metallics Sources (000 t)</b>				
<b>Captive DRI/HBI</b>	<b>34.2</b>	<b>42.2</b>	<b>67.8</b>	<b>86.5</b>
<b>Merchant HBI</b>	<b>7.5</b>	<b>11.0</b>	<b>15.7</b>	<b>17.6</b>
<b>% DRI/HBI in Charge</b>	<b>13.18</b>	<b>13.25</b>	<b>17.61</b>	<b>18.49</b>
<b>Domestic Pig Iron</b>	<b>10.0</b>	<b>23.1</b>	<b>26.9</b>	<b>33.7</b>
<b>Merchant Pig Iron</b>	<b>14.6</b>	<b>10.8</b>	<b>10.6</b>	<b>11.6</b>
<b>Hot Metal</b>	<b>5.0</b>	<b>9.3</b>	<b>11.6</b>	<b>14.5</b>
<b>Scrap</b>	<b>244.9</b>	<b>305.1</b>	<b>341.1</b>	<b>399.0</b>

# Metallics Prices (Jan 98 – Jan 09)

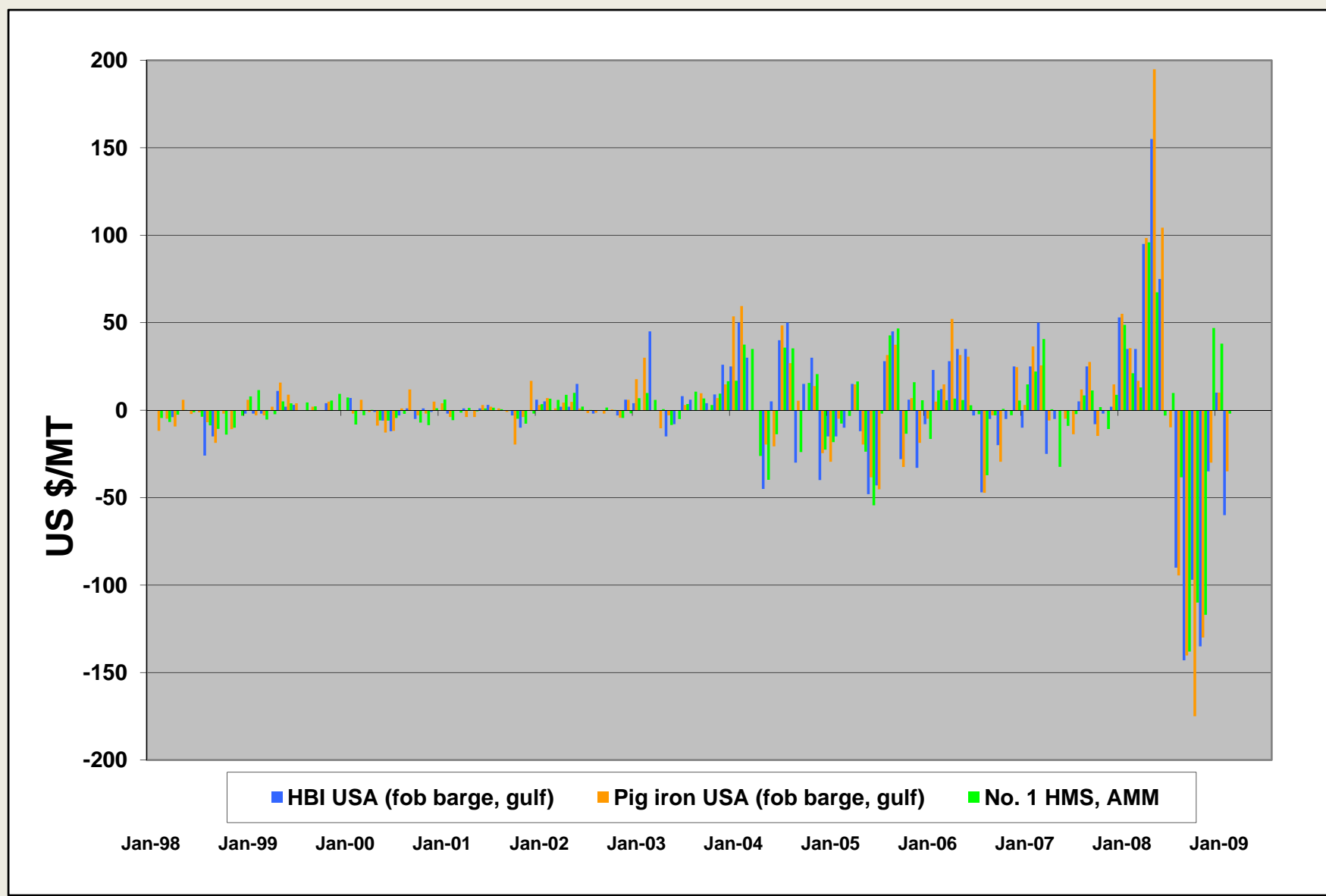


Source: CRU & AMM

# Metallics Prices (Jan 04 – Jan 09)



# Metallic Prices – Monthly Change



# Thank You for Your Attention

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