| Comparison of Ironmaking and Steelmaking Technologies[21] | | |
|---|---|---|
| **Technology** | **Major Advantages** | **Major Disadvantages** |
| **Established Technologies** | | |
| Integrated | • raw materials are relatively stable in price and composition compared to scrap<br>• economies of scale<br>• can produce all products | • very high capital cost requires agglomerated feed/sinter plant (extra costs and environmental problems)<br>• requires coking coal & coke ovens (extra costs and environmental problems)<br>• high overheads |
| Mini-mill | • small economic scale<br>• low capital cost<br>• low overheads<br>• DRI/iron carbide can overcome tramp element problem<br>• thin slab casting technology enables the production of flat products | • operating costs vary with the scrap price<br>• tramp elements in scrap<br>• high quality products dependant on access to high quality feed materials<br>• scrap transport costs represent a high proportion of scrap price |
| DRI - Electric Arc Furnace (EAF) | • not limited by scrap supply<br>• no need for coking coal<br>• technology for using iron ore fines has now been demonstrated<br>• provides economic use for gas which might otherwise be flared<br>• no quality limitations | • capital cost for DRI significant<br>• limited to lump ore until recently<br>• needs low cost gas to be economic<br>• EAF operating costs higher for DRI feed than for scrap<br>• DRI requires high iron content ore<br>• more energy intensive |
| **Recently Commercialised Technologies** | | |
| EAF/Thin slab casting | • saves on capital and operating costs by eliminating some hot rolling | • until recently quality not as good as integrated route |
| Iron Carbide - EAF | • as for DRI<br>• approx 6% carbon content saves energy costs compared to DRI | • can only make up approx 20% of feed<br>• first commercial iron carbide plant has required several modifications |
| COREX® | • lower capital cost than integrated<br>• produces excess gas for DRI or power generation<br>• steaming coal acceptable - no need for coking coal | • economics depends on credits for excess gas<br>• probably less efficient than Hismelt & other direct smelting technologies<br>• needs lump ore or pellets |
| **Technologies Yet To Be Commercialised** | | |
| HIsmelt/ Other Direct Smelting Technologies | • steaming coal acceptable - no need for coking coal or coke ovens<br>• uses iron ore fines | • not yet proven |
| Mini-mill with thin strip casting (BHP's Project M) | • potential to eliminate all hot rolling<br>• lower economic scale and capital cost compared to Nucor type mini-mill | • not yet proven |

[2] Adapted from "The Australian Iron and Steel Industry", Report to the Minister for Industry, Science and Tourism, Parliamentary Committee Inquiring into the Steel Industry, Sept. 1997

[1] "The Australian Iron and Steel Industry", Report to the Minister for Industry, Science And Tourism, September 1997