

Comparison of Ironmaking and Steelmaking Technologies¹

Technology	Major Advantages	Major Disadvantages
Established Technologies		
Integrated	<ul style="list-style-type: none"> • raw materials are relatively stable in price and composition compared to scrap • economies of scale • can produce all products 	<ul style="list-style-type: none"> • very high capital cost requires agglomerated feed/sinter plant (extra costs and environmental problems) • requires coking coal & coke ovens (extra costs and environmental problems) • high overheads
Mini-mill	<ul style="list-style-type: none"> • small economic scale • low capital cost • low overheads • DRI/iron carbide can overcome tramp element problem • thin slab casting technology enables the production of flat products 	<ul style="list-style-type: none"> • operating costs vary with the scrap price • tramp elements in scrap • high quality products dependant on access to high quality feed materials • scrap transport costs represent a high proportion of scrap price
DRI - Electric Arc Furnace (EAF)	<ul style="list-style-type: none"> • not limited by scrap supply • no need for coking coal • technology for using iron ore fines has now been demonstrated • provides economic use for gas which might otherwise be flared • no quality limitations 	<ul style="list-style-type: none"> • capital cost for DRI significant • limited to lump ore until recently • needs low cost gas to be economic • EAF operating costs higher for DRI feed than for scrap • DRI requires high iron content ore • more energy intensive
Recently Commercialised Technologies		
EAF/Thin slab casting	<ul style="list-style-type: none"> • saves on capital and operating costs by eliminating some hot rolling 	<ul style="list-style-type: none"> • until recently quality not as good as integrated route
Iron Carbide - EAF	<ul style="list-style-type: none"> • as for DRI • approx 6% carbon content saves energy costs compared to DRI 	<ul style="list-style-type: none"> • can only make up approx 20% of feed • first commercial iron carbide plant has required several modifications
COREX [®]	<ul style="list-style-type: none"> • lower capital cost than integrated • produces excess gas for DRI or power generation • steaming coal acceptable - no need for coking coal 	<ul style="list-style-type: none"> • economics depends on credits for excess gas • probably less efficient than Hismelt & other direct smelting technologies • needs lump ore or pellets
Technologies Yet To Be Commercialised		
Hismelt/ Other Direct Smelting Technologies	<ul style="list-style-type: none"> • steaming coal acceptable - no need for coking coal or coke ovens • uses iron ore fines 	<ul style="list-style-type: none"> • not yet proven
Mini-mill with thin strip casting (BHP's Project M)	<ul style="list-style-type: none"> • potential to eliminate all hot rolling • lower economic scale and capital cost compared to Nucor type mini-mill 	<ul style="list-style-type: none"> • not yet proven
<p>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</p>		

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

